9

BULLETIN OF THE

TAYLOR SOCIETY

A SOCIETY TO PROMOTE THE SCIENCE AND THE
ART OF ADMINISTRATION AND OF MANAGEMENT

PART II

OF

PROCEEDINGS

OF THE

MEETING OF THE TAYLOR SOCIETY

HELD AT

NEW YORK

DEC. 5 and 6, 1919

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ENGINEERING SOCIETIES BUILDING
29 WEST THIRTY-NINTH ST., NEW YORK

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(Extract from the Constitution)

The objects of this Society are, through research, discussion, publication and other appropriate means:

1. To secure an understanding and intelligent direction of the principles governing organized effort for the accomplishment of industrial and other social purposes for the mutual benefit of
    - A. The Community
    - B. Labor
    - C. The Manager
    - D. The Employer

2. To secure the gradual elimination of unnecessary effort and of unduly burdensome toil in the accomplishment of the work of the world.

3. To promote the scientific study and teaching of the principles governing organized effort, and of the mechanisms of their adaptation and application under varying and changing conditions.

4. To promote general recognition of the fact that the evaluation and application of these principles and mechanisms are the mutual concern of the community, labor, the manager and the employer.

5. To inspire in labor, manager and employer a constant adherence to the highest ethical conception of their individual and collective social responsibility.

(Continued on inside back cover)

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COMMENT

FOR the benefit of those who have not seen the preceding issue of THE BULLETIN, attention is called to the fact that this issue contains only part of the proceedings of the New York meeting of the Taylor Society. The leading articles presented at that meeting which were published in Vol. V., No. 1 (Feb. 1919) are "Standards", by H. K. Hathaway, and "The Foreman", by Sanford E. Thompson.

ALL the articles published in this issue are thought provoking. Mr. Barth's paper contains "higher mathematics" which may not be intelligible to the man on the street (and to most employment managers), but the argument should be intelligible to everyone. It raises the question whether after all our labor-turnover formulas will amount to much until we are able to incorporate into them factors which take account of the reasons for separations and hirings. A measure of quality of management, and not merely a measure of turn-over loss, is what we seek in the use of these formulas, and the *reasons* for turn-over are essential to any comparisons of quality of management based on the movement of employees.

THE article "Mutual Rating" is the recital of an interesting experiment. We hope it will be thoroughly tried out. It is of interest from several angles; first, simply as an example of technique in participation; second, it raises the question whether participation *per se* increases output; third, it raises the further question whether, regardless of the influence on output of participation *per se,* there may not result from such a system of rating an increased production because of the better selection and assignment of workers, foremen and superintendents. The performance of any executive function involves a combination of technical, teaching and selling ability. Teaching and selling effectiveness are largely a matter of mental and spiritual contact; of personality. May not the workers as a group be a better judge of those qualities in a foreman than is the superintendent; may not the foremen be better judges of those qualities in a superintendent than is the works' manager? Is it not possible also that they may be at least equally competent to judge technical ability?

ITEMS in the press, during and since the strike of the bituminous coal miners, have prepared us to believe that in that industry there exists the grossest managerial incompetence. Mr. Archbald's paper practically convinces us, and that by a consultation of notes concerning management taken casually before the strike in the midst of his duties as an engineer, and not the result of any special investigation of management in the mines. And his postscript is especially suggestive; the American Institute of Mining and Metallurgical Engineers, at a meeting held *after* the strike, failed in discussion of the problem to get to the heart of it—namely, the competence of the management. They talked about the need of better machinery, but not about planning and the coordinated use of existing equipment. Readers of the discussion of Mr. Archbald's paper will be interested in the suggestion that in the mining industry there does not exist a motive on the part of the owners for better management, for the reason that the costs—to the owner, not to the worker—of incompetent management can be loaded onto the consuming public. As interesting to the reader in his capacity of citizen as are the technical problems to him in his capacity of engineer!

THE account of the President's Industrial Conference of October, 1919, by two members of the Public Group, one an active manager and the other an investigator and publicist, is interesting, not so much because of the details recited as because of the additional light thrown on the composition of the Conference and on attitudes of mind in the Conference. Were the members of the Employer Group really representative of *employers* as the word is commonly understood—persons who in the performance of their functions are reasonably near to negotiations with labor and to the conditions under which labor works and lives? Were the members of the Labor Group really representative of the wage earner—were they persons who in the performance of their functions are reasonably near to negotiations with management, to the shop, to the problems of production and to the conditions of the industry? Was management represented—those who negotiate with and direct labor? Were not the few real managers present so scattered and lost among other groups as to make impossible the expression of a managerial group opinion? Was the Public Group homogeneous; may not other groups have had the strategic advantage of representation on it? And as for attitudes of mind—the reader may raise those questions for himself.

DILUTION OF MANAGEMENT

THE following excerpts are from notes, originally offered in response to a query from the editor of the *Manufacturers Record*, which seem to have presented a sufficiently novel point of view to justify their publication by the contributors, the Aberthaw Construction Co. Modestly offered as "merely a passing contribution to a large subject," they nevertheless present an aspect of the problem of inefficient production which has been too much neglected:

It is difficult to make absolute statements regarding any aspect of the labor situation today, without danger of prompt and well supported contradiction from some quarter. This is partly due to differences in viewpoint, and hence in the interpretation of apparently chaotic phenomena; partly to the inexactitude of the terms in which men are wont to phrase their opinions.

What, after all, do we mean by the efficiency of labor? If its standard is the number of hours per week during which labor is willing to exert itself, then, assuredly, efficiency is lower than it has been. If its standard is actual dollars and cents cost per unit of production, again labor is on the defensive. Probably it will remain on the defensive in any general consideration of totals of time and money necessary to producing a given result. But do these totals constitute a fair measure of labor efficiency?

At this point another term calls for definition. What, after all, is labor? Is it justifiable to compare the accomplishment of the often highly dilute labor forces of this era of inflation with the better trained and better selected groups of the pre-war period? Dilution, by which is meant weakening the effective strength of skilled groups by the addition of less skilled or virtually unskilled workers, is one of the first results of rapidly expanding business.

And where, further, does labor leave off and management begin, or vice versa? In the building trades, for example, labor is extremely responsive to the quality of its management. Oftentimes coordination, or the lack of it, is the underlying cause of the difference between good work and poor, high costs and low. Thus primary responsibility for results may lie at the door of management;—for management, be it remembered, is not merely the engineering force or the superintendent on the job; it is the entire agency of supervision, which extends down through an organization from president to gang boss.

Today, dilution of management constitutes almost as serious a problem as dilution of labor. In some instances, it is more serious. Dilution of management sometimes expresses itself in lack of individual capacity; sometimes in disproportionate ratios of workmen to supervisors. In building, wherever these ratios exceed fairly determinable limits, costs inevitably begin to climb. And since it is, even in the most inflated of boom times, easier to increase labor forces than to find adequate supervision in satisfactory proportion, increased labor costs, under the circumstances, may be chargeable quite as properly against management as against labor.

In the opinion of the Aberthaw Construction Company the increase in relative costs of building labor during boom times is primarily to be attributed to the dilution of labor and of management,—particularly management in the lower grades. The regular laborer appears to be working just about as steadily and as satisfactorily at one time as another, though his hours of work tend to become fewer.

Given competent supervision, his unit volume of work shows no appreciable diminution; often it shows an increase. For example, a study of the cost of quarrying, breaking, handling to crusher, and crushing stone, made for the years 1910, 1914, 1918, 1920, when corrected to a fixed monetary standard, shows labor accomplishment more satisfactory in the latter years than in the former.

A WAGE ADJUSTMENT BASED ON COST OF LIVING CHANGES

IN nearly all current wage negotiations the high cost of living plays a prominent part, at least in the workers' demands if not in the final settlement. Locally, many readjustments are frankly made to meet rising living costs, and nationally at least one industry officially recognizes the cost of living as compared to pre-war levels as a basic factor in wage adjustments. It is interesting to know therefore how this factor actually influences negotiations. A recent wage readjustment in the printing industry in Chicago furnishes a concrete illustration of the practical application of this factor in securing a settlement.

The cost of living became an officially recognized basis as a result of a contract made last summer containing the following clause:

> Unless it can be shown by the Cost of Living figures of the U.S. Department of Labor, Bureau of Statistics, that during the six months' period from the date this contract is effected and at intervals of six months thereafter, the cost of living has increased 5% or more, then and then only shall the officers of the Unions herein represented, have the right to ask for a further readjustment of the wage scales herein set forth, provided, that the percentage of increase shall apply only to the 1914 scales, the same basis as has been used to work out present scales, as embodied in this agreement, and, further provided, that should the cost of living for one of the six months periods decrease by an amount equal to or exceeding the increases, then any increases above the amount now granted in this agreement may be decreased in the same proportion, provided that no figures shall reduce the scales below those set forth in this agreement.

This clause is part of a supplemental agreement to a five year contract made in 1916. War conditions practically voided the wage clauses in the contract, there being five scale revisions. These rapid wage changes added to the rising commodity costs have led most firms to protect themselves with material and labor clauses in their contracts. They were thus largely free to pass on to the consumer any increased labor costs. Labor on the other hand was earning greatly in excess of the scale, often double or treble, due to overtime brought on by the activity in the industry and the inadequacy of the labor supply. The situation then was one in which labor occupied markedly the strategic position, but in which the self interest of both parties dictated a peaceable settlement in order that both might reap the fruits of prosperity.

The six months period mentioned in the contract expired in February and negotiations were opened by the interested unions. Due to failure of an appropriation the Bureau of Labor Statistics' figures for living costs were not available, so this settlement under the literal terms of the contract could not be made. The unions then suggested that the clause be waived, and presented a demand for a large uniform scale increase. The employers countered with a small increase which they were careful to base on an available Bureau of Labor Statistics food index. This offer was almost immediately raised considerably by the employers and as promptly rejected by the unions who reiterated their previous demand. Although the employers' offer was based on food prices it was nevertheless looked upon as a matter of negotiation by the union representatives, who insisted on doing away with per cent increases in food costs and talking on a basis of dollar increase in wages.

At this point a new spokesman entered the conference for the employers and succeeded, against strenuous opposition from the unions, in reintroducing into the discussion the matter of cost of living statistics. From this point on the employers insisted on the application of the latest cost of living figures obtainable, in lieu of the Bureau of Labor Statistics figures required by the contract, and further insisted on a settlement of the matter by the statisticians. The statistician of the unions beclouded the discussions with a huge mass of undigested and irrelevant figures. This did not however seriously trouble as the unions had come to know the statistician of the employers from previous negotiations as absolutely fair, and the peculiar situation was presented of the unions believing him in preference to their own man. After several days delay a figure was finally agreed upon as representing the per cent increase in the cost of living, but which, when reduced to a uniform wage increase, made a compromise figure acceptable to both sides and was finally agreed upon.

At the outset of the negotiations the unions, sensing the balance of power in their favor, attempted to get back to the old basis of negotiation and very nearly succeeded, actually if not in terms. The employers recognized that the principle could not be rigidly applied, but determined that it was worth preserving even if in the application it might be somewhat stretched. The stretching occurred in the figures finally adopted as representing the increase in the cost of living. As a result, however, of the determination of the employers, the principle was preserved as a basis for future adjustments and both employers and employees received a valuable lesson in procedure.

J. H. Batchelor.[1]

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[1] Recently Managing Executive, The Franklin-Typothetae of Chicago.

LABOR TURNOVER[1]

A MATHEMATICAL DISCUSSION

By

CARL G. BARTH[2]

✓

BELIEVING that some kind of mathematical analysis might be made to throw light on the main point in the controversy about how labor turnover ought to be calculated, I recently set to work on such analysis as the mathematics within my reach would enable me to make; and having obtained some interesting results, I now wish to present them to the Taylor Society.

So far as I know labor turnover is by everybody presented as a percentage arrived at by dividing the denominator of a fraction into the numerator of that fraction, and the controversy centers on what elements should enter into the two terms of this fraction.

Thus, one set of advocates seems to contend that the average working force for the period considered, as ascertained from the number of workers on the total payroll, should be made the denominator of the labor turnover fraction, while another set contends that the working force so to be used, should include only the average number of workers actually in attendance during that period.

As to the numerator, some advocates contend that this should consist of the total number of separations during the period considered, while others contend that only the number of actual replacements of the separated workers should be used. This makes possible altogether four distinct ways of calculating labor turnover, all of them probably in use; and it is needless to say that until only one of these is adopted as a standard, general comparisons cannot be made of labor turnover in different plants or industries. Of course, as is no doubt universally recognized, when the average working force either remains constant or increases during several periods, these alternative numerators are alike, for then all separations are replaced.

My mathematical analysis is entirely confined to throw light on the question of which of the two alternative numerators should be used, and the conclusion reached is in a broad way in favor of the total separations as against the replacements only, regardless of whether the total force is increasing or decreasing. Incidentally it has also led me to believe that, as a matter of consistency, the average total payroll should be made the denominator as against the average total attendance only; for the workers that do not attend during the period considered are not separated so long as their names are retained on the payroll.

In this analysis I consider a working force that is increasing according to some simple mathematical law, through the hiring of more workers than the increase of the force directly demands, on account of the separations that constantly occur and which must first be replaced. These separations I have divided into two classes; viz., separations from the force as it was at the beginning of the period considered (the original force) and separations from among the new workers since hired. To be sure, the new workers soon become more or less amalgamated with the remaining workers of the original force so that no definitely determinable distinction can long be made between a new and an old worker; but by assuming such a division, and also assuming a different rate of separation for each, I figure that I am closer to what actually takes place than by assuming one rate of separation for the total working force at all intervals during the period considered; and when this period does not exceed that usually employed in periodic labor turnover calculations of the one kind or the other, the assumption is legitimate enough for a mere mathematical theory.

Mathematically considered there is no essential difference between an increasing and a decreasing force, a rate of decrease being simply a negative or minus rate of increase, and a constant force at the same time being one whose rate of increase is 0, or the dividing line between the positive and the negative rates of increase. For this reason, any truly mathematical expression for labor turnover that may be agreed upon as being correct for an increasing force, must necessarily also hold good if the rate of the increase gradually diminishes; first to 0, when the force then momentarily becomes stationary or constant; next, becomes negative, or, what is then the same thing, becomes a positive rate of decrease, and, with it, the force becomes a decreasing one.

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[1] A paper presented at the annual meeting of the Taylor Society, New York, Dec. 5 and 6, 1919.

[2] Consulting Engineer, Philadelphia, Pa.

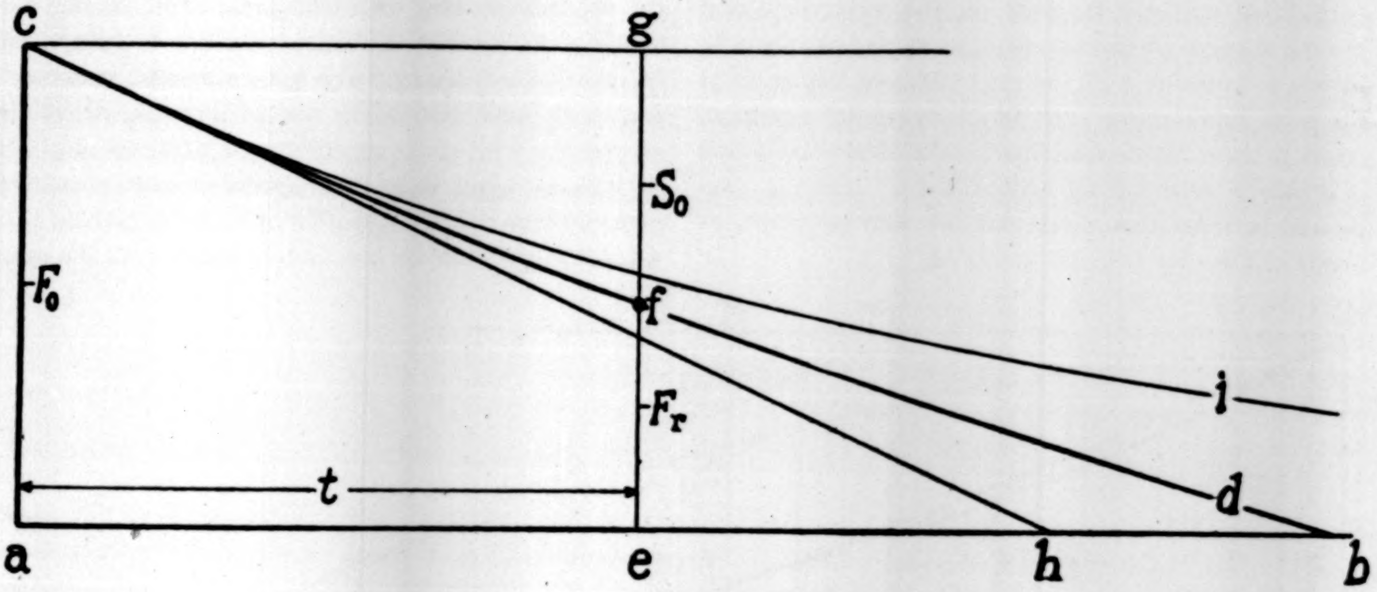

Fig. 1

In the diagram Fig. 1, the vertical line $ac=F_o$ represents the working force at the beginning of the period to be considered (the original force), and the vertical distance $ef=F_r$ represents similarly the remaining portion of the original force at the end of the period of time t (days, weeks or months) which is represented by the horizontal distance ae along the base line **ab**, while the vertical distance $fg=S_o$ then represents the separations from the original force during the same time t. The first question is then: What mathematical law can we assume to express near enough correctly the relation between the time t and the decreased force F_r in view of the fact that no statistics have probably ever been compiled to show, for even a single plant, how an original force gradually decreases to O through a term of years depending on the degree of "mutual employment satisfaction" and on such unpreventable causes as death, protracted illness, etc.?

Let us assume, for example, an original force F_o of 1000 workers, and that, to begin with, these separate themselves at the rate of 100 each month. Then, at the end of the first month, there would be left a force of 900 workers. If this rate of 100 per month should keep up until the force is entirely depleted, this would evidently take place in just $\frac{1000}{100}=10$ months. This, however, would be an absurd law of depletion of such a force, for it would mean that all of the 100 workers remaining at the end of the 9th month would be separated during the 10th month.

Let us then assume, on the other hand, that the rate of 100 leaving the first month out of an original total of 1000, keeps up indefinitely in the same proportion only, then we would have:

TABLE 1.

At beginning of	Size of Force	Separations during
1st month	1000	100
2nd month	900	90
3rd month	810	81
4th month	729	72.9

and a complete depletion of the original force would never take place, which again is an impossibility, for ultimately the workers must all separate at least through death.

These two extreme, and hence absurd, assumptions are respectively represented in the diagram Fig. 1, by the straight line *ch* and the curve *ci*, both of which, to begin with, coincide quite closely with the curve *cd* which is located between them in a manner to represent more nearly the correct law of depletion of the force.

It will now be realized that, as a mathematical law of depletion can only be an approximate one (just as is the mortality law used by life insurance companies), the mathematical expressions for the straight line *ch* and the curve *ci* will both, for a short period, represent quite closely the approximate law of depletion of the force, as this has been illustrated by the curve *cd*.

Further, if we knew the extent to which an original force would deplete itself through a somewhat longer period, but still one far short of the entire depletion period, a curve of the nature of *ci* in Fig. 1 might be drawn to coincide with the true curve of depletion at the point representing such period of partial depletion, when it then, most undoubtedly, would also be found to coincide very closely with the true curve of depletion between this point and the starting point, as illustrated by the diagram in Fig. 2.

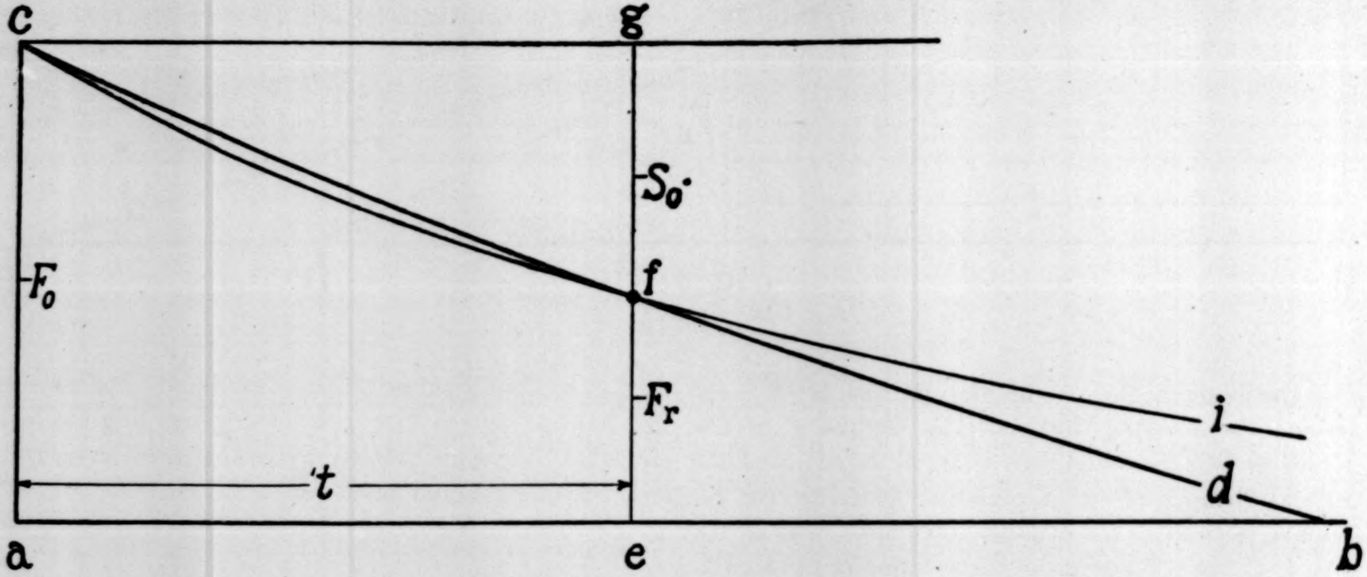

Fig. 2

Hence, for the purpose of this discussion, it will be assumed that the curve representing the gradual depletion of an original force may be approximated by a curve representing a law of depletion similar to that on which Table 1 was constructed. This curve is a logarithmic curve[1] whose equation is

$$F_r = \frac{F_o}{\mathcal{E}^{rt}} \quad , \qquad (1)$$

$\mathcal{E}$ being the base of the Naperian system of logarithms, r the rate of depletion (separation) and t the period of time during which the original force F_o is reduced or depleted to F_r.

We must next determine upon some law in accordance with which we will wish to increase the original force by hiring new workers; first, to replace the separations from this original force as fast as they occur; and secondly, to increase the thus replenished original force to the point desired at any one time, in spite of the separations that also take place from among the newly hired workers. Of course, a law to govern the increase of a working force must either be in accordance with some decreasing rate of increase, or else in accordance with some constant or even increasing rate of increase, which must then, sooner or later, come to a more or less sudden stop; for it is inconceivable that a force might increase indefinitely under even the most favorable conditions of industrial expansion.

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[1] Formula (1) may be derived as follows: The original force F_o having been reduced to F_r at the end of the time period t, and the decrease taking place at the rate r as figured on the magnitude of F_r at any time, the decrease (negative increase) during the time element δt following the end of the time period t, may be written

$$\delta F_r = F_r(-r)\delta t, \text{ and } \frac{\delta F_r}{F_r} = -r\,\delta t$$

Integrating, we then get, as $\int \frac{\delta x}{x} = \log_e x + C$,

$$\log_e F_r = -r t + C.$$

To determine the constant of integration C we have $F_r = F_o$ for $t = o$, which makes $C = \log_e F_o$, and

$$\log_e F_r = -rt + \log_e F_o; \text{ and further}$$

$$\log_e F_o - \log_e F_r = \log_e \frac{F_o}{F_r} = rt,$$

which again gives $\mathcal{E}^{rt} = \frac{F_o}{F_r}$; and finally

$$F_r = \frac{F_o}{\mathcal{E}^{rt}} \qquad (1)$$

In view of the circumstance that labor turnover, while usually converted into the equivalent of an annual rate, is always calculated for shorter periods only, almost any general law of force increase that we may assume and which will readily lend itself to the mathematical treatment contemplated, will answer, just the same as we have already concluded that the law assumed for the separations from an original force must be near enough correct for use in our analysis.

In the diagram Fig. 3, let the curve *ck* represent an ideal law of increase of the original force $ac = F_0$ to the final desired force during the period of time $ab = T$. This curve is then, to begin with, quite closely approximated by its tangent *cm* at the point *C*, and represents the general mathematical law of increase of the working force that I have assumed for the present purpose.

If *i* designates the rate of increase of the force *F* as figured on the original force F_0, the increase of the force at the end of the time period *t* will be

$$A = F_0 i t \qquad (2)$$

and the increased force will be

$$F = F_0 + A = F_0 (1 + i t) \qquad (3)$$

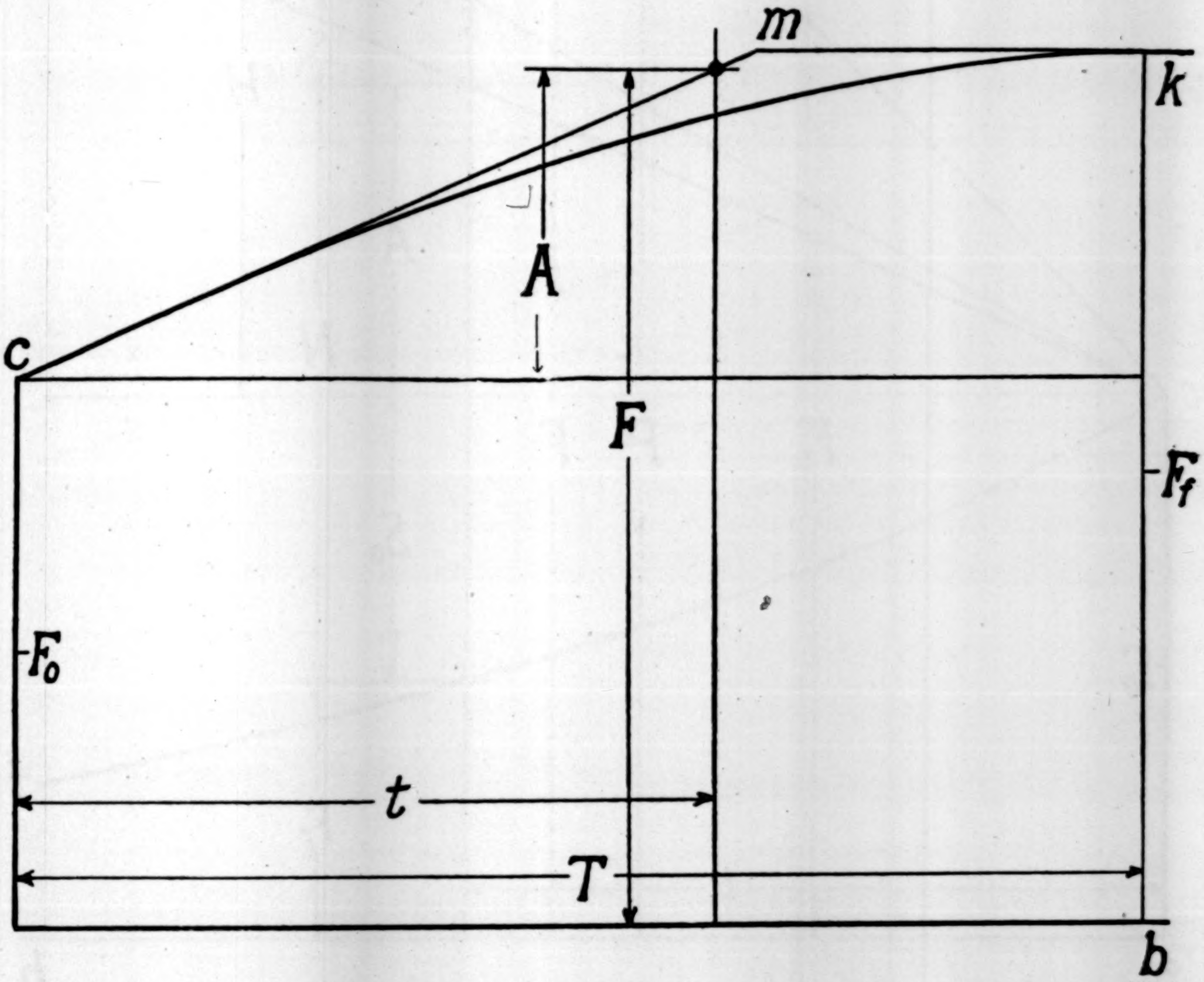

Fig. 3

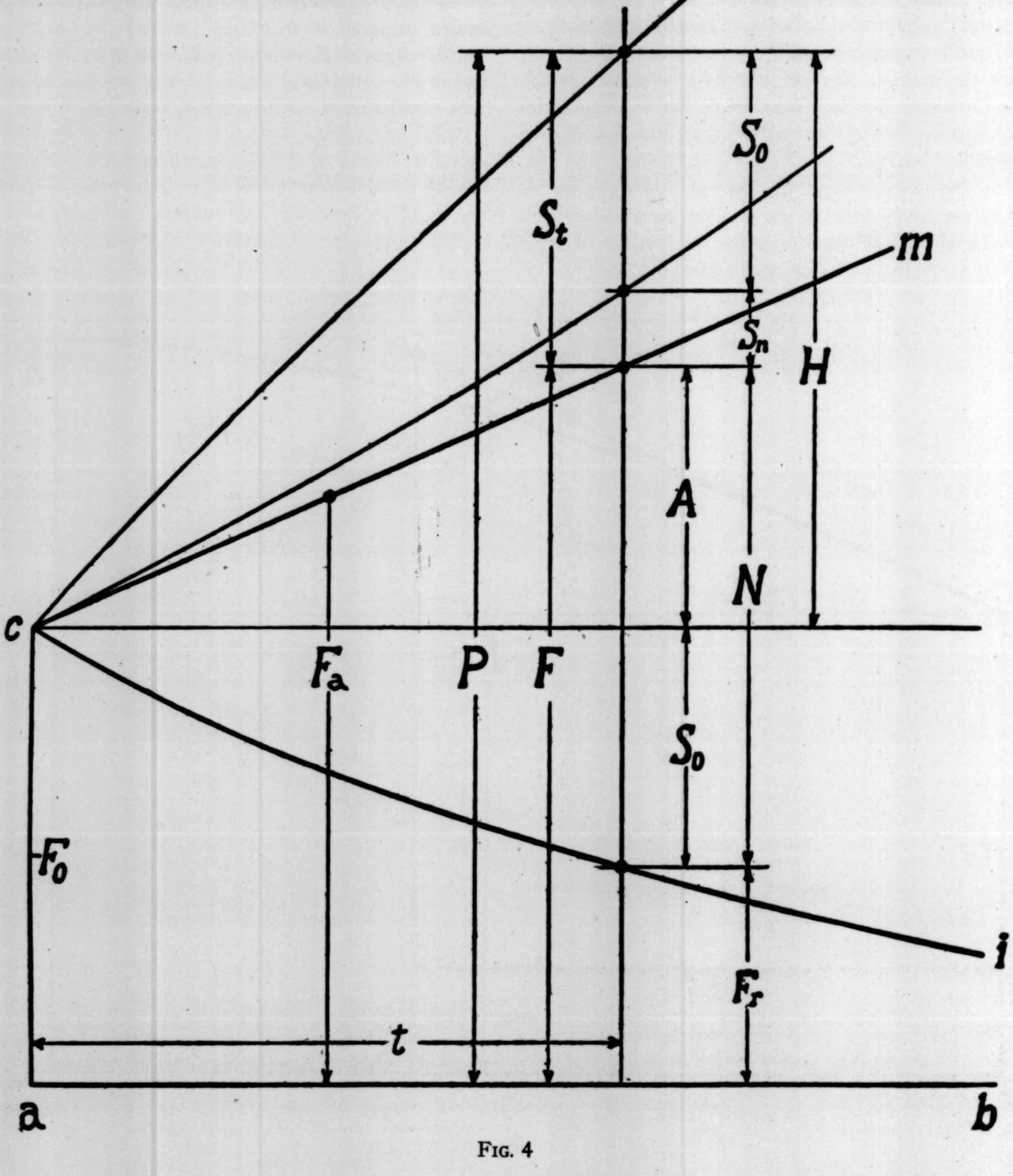

FIG. 4

In Fig. 4 all the elements that enter into our analysis have been represented. Thus, besides the elements already referred to, we have

$S_o = F_o - F_r$ = number of separations from the original force, and by substituting the value of F_r in formula (1), this becomes

$$S_o = F_o\left(1 - \frac{1}{\mathcal{E}^{rt}}\right). \qquad (4)$$

$N = A + S_o$ = total number of new workers on the increased force F, and by substituting the value of A in formula (2) and the value of S_o in formula (4), this becomes

$$N = F_o\left(i\,t + 1 - \frac{1}{\mathcal{E}^{rt}}\right). \qquad (5)$$

F_a = average force during the time period t.

For the simple straight line law of increase assumed for the force, we have

$F_a = \frac{1}{2}(F_o + F)$, which, when we substitute the value of F in formula (3), becomes

$$F_a = \tfrac{1}{2}\,[F_o + F_o(1 + i\,t)] = F_o\left(1 + \frac{i\,t}{2}\right) \quad (6)$$

If by n we now designate the rate at which separations take place from among the new workers N on the force, the total number of such separations during the time period t can be shown to be[1]

$$S_n = F_a\,n\,t - \frac{n}{r}\,S_o \qquad (7)$$

Adding formulas (4) and (7) we finally get the total number of separations that have taken place, to be

$$S_t = S_o + S_n = S_o + F_a\,n\,t - \frac{n}{r}\,S_o = F_a\,n\,t - \frac{n-r}{r}\,S_o \qquad (8)$$

Further

$H = A + S_t$ = total new hires during the period, and

$P = F_o + H$ = total number of names on the payroll during the period.

If we now calculate the total labor turnover for the period of time t by the universally accepted method for an increasing force, viz., making the numerator of the labor turnover fraction equal to the total separations for the period (which for both an increasing and a constant force equals replacements), and using the average force as given by formula (6) as denominator, we get

Total labor turnover

$$L_t = \frac{S_t}{F_a} = \frac{F_a\,n t - \frac{n-r}{r}\,S_o}{F_a} = n\,t - \frac{n-r}{r}\cdot\frac{S_o}{F_a}, \qquad (9)$$

which divided by t finally gives the labor turnover for the unit time period (rate of labor turnover for the period t).

$$L_1 = n - \frac{n-r}{rt}\cdot\frac{S_o}{F_a} \qquad (10)$$

In this formula all evidence of its having been derived by considering an increasing force only, has entirely disappeared. To be sure, for an increasing force the average force F_a during the time period t would be greater than the force at the beginning of the period (original force), and for a decreasing force it would be smaller than F_o; but in nominally applying the formula we need to know only the magnitude of the average force F_a.

Hence, as I see it, this formula compels us, for the sake alone of the respect we owe mathematical logic and consistency, to figure labor turnover by considering separations and not replacements, in the case of a decreasing force also.

If in formula (10) we make no attempt at distinguishing between the average rate n at which new workers leave, and the average rate r at which workers of the original force leave, it reduces itself to

$$L_1 = n = r \qquad (11)$$

---

[1] Formula (7) may be derived as follows: Let δS_n = number of separations from the new workers N which takes place at the rate n during the time element δt following the time period t, then

$$\delta S_n = N n \delta t = F_o\left(i\,t + 1 - \frac{1}{\mathcal{E}^{rt}}\right) n \delta t$$

$$= F_o\,[n\,i\,t\,\delta t + n\,\delta t - n\mathcal{E}^{-rt}\,\delta t]$$

$$= F_o\left[n\,i\,t\,\delta t + n\delta t - \frac{n}{r}\mathcal{E}^{-rt}\,\delta(-rt)\right].$$

Integrating we then get, as $\int \mathcal{E}^x\,\delta_x = \mathcal{E}^x + C$,

$$S_n = F_o\left[ni\int t\,\delta t + n\int \delta t + \frac{n}{r}\int \mathcal{E}^{-rt}\,\delta(-rt)\right]_{t=o}^{t=t}$$

$$= F_o\left[ni\frac{t^2}{2} + n\,t + \frac{n}{r}\,\mathcal{E}^{-rt}\right]_{t=o}^{t=t}$$

$$= F_o\left[\left(1 + \frac{i\,t}{2}\right) n\,t - \frac{n}{r}\left(1 - \frac{1}{\mathcal{E}^{rt}}\right)\right]$$

By formulas (4) and (6) this reduces to

$$S_n = F_a\,n t - \frac{n}{r}\,S_o\,. \qquad (7)$$

The labor turnover is then only the average rate at which workers separate from a force for all other reasons than laying off due to lack of work, whenever such a condition exists.

But when all is said and done, I cannot see that anything very valuable is to be learned from figuring the total labor turnover by any method, for it shows merely in a broad and superficial manner whether the labor situation is good or bad. So many different causes combine to produce the total effect which the rate of labor turnover measures, that it would seem as if the effect of each of these causes should be studied entirely apart from the others; and particularly so, as I cannot see that this would involve a great deal more labor and expense. Thus it would seem that separations due to such unpreventable causes as permanent disability, death, etc., should not be merged with those due to dissatisfaction on the part of either employer or employee; and also that separations due to this preventable cause should be studied in classes of employees grouped according to length of service, nationality, etc.

F. S. Crum[1]: While studying the turnover problem for the Emergency Fleet Corporation last year, I didn't realize it was so mathematical;—otherwise I might not have attempted it.

I simply wish to emphasize a question which Mr. Barth has raised,—whether there is a law of normal turnover. I doubt it very much, whether for an industry or for a given plant, because the human element plays too large a part. It seems to me that the essence of the problem is to reduce preventable separations to a minimum by every possible means. The purpose of the records and the calculations is to give the manager information to that end. Even crude records, if they give reasons for separations, are greatly helpful.

While on my feet I should like to say that I believe that the formula proposed at the Rochester convention and adopted by the Employment Management Association is theoretically wrong;—they figure turnover on the basis of attendance and not of payroll. It seems to me that payroll must be the basic factor. Of course the payroll should be cleared periodically. Moreover there are other things desirable and necessary to calculate,—for instance absenteeism,—and I believe that should be calculated on the basis of the payroll.

S. H. Slichter[2]: I am not a mathematician and would not venture to discuss Mr. Barth's mathematical argument. There are, however, two points I wish briefly to bring up. Like Mr. Crum, I question whether there can be discovered a law of normal turnover, there are such variations by cycles of prosperity and depression, by seasons, by industries, by regional conditions, by plant conditions, by occupations within each plant, or region or industry. We may in time accumulate data sufficient to give us a formula, but the progress of management during the period of accumulation may render it non-representative; also we must remember that the more dispersed the data the less significant the average and the formula.

With respect to the preference for replacements or for separations as the measure of turnover, my conviction favors the use of separations, even during periods of a decreasing force. The use of separations, for instance, prevents the management from hiding from itself the facts that jobs are becoming extinct; the necessity of replacing a man is simply a question of time,—not tomorrow, perhaps, but several months hence. Something is lost by losing a man. It is part of a manager's job to keep his eye on jobs necessary to be performed in the long run, and not to allow them to become extinct. Separations which require ultimate are as important as those which require immediate replacement. And, if you stop to think, from the worker's or from the public standpoint, separations are much more important than replacements.

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[1] Asst. Statistician, Prudential Insurance Co., Newark, N. J.

[2] Princeton University, Princeton, N. J.

MUTUAL RATING[1]

A CONTRIBUTION TO THE TECHNIQUE OF PARTICIPATION

BY

HENRY WOOD SHELTON[2]

IN the very beginning I wish to make it clear that the particular technic of mutual rating that will be shown you is not the hypothetical working out of some favorite preconceived theory. It was developed under the stress of actual conditions to meet an urgent problem. It was avowedly experimental, and because it could not, under the circumstances, be carried to its logical conclusion, the results are by no means complete. Just because of the adverse conditions under which the experiment was carried on, however, the results achieved may be considered all the more significant. It remains for industry to grasp their significance, and follow the principles through to conclusive demonstration in various organizations.

The charts are reproductions of actual charts which were used, the only change being the substitution of fictitious for original personal names. Whatever I may suggest regarding the significance and philosophy back of these ratings, is the outcome of observation and study of the facts illustrated.

The Emergency Fleet Corporation was, as is well known, created almost out of hand. In the minds of many this meant an opportunity to become a model organization, especially in view of the recognized ability of a large number of the executives who were often referred to as a "galaxy of stars". The difficulty, however, proved to be the harmonizing of so many luminaries into a smoothly working constellation.

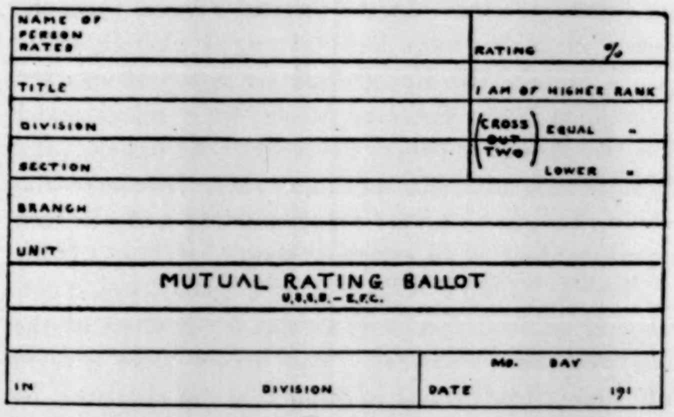
Within eighteen months the home office grew from less than one hundred to over forty-four hundred employees. The result was an aggregation, not an organization. One department of about fifteen hundred employees supplied the clerical service (stenographers, typists, file-clerks, messengers, etc.) to all the others. This service became unsatisfactory. Without my going into the causes, the other departments felt they were not getting what they had a right to expect, and the situation among the personnel was growing acute. Those at the head of the corporation wanted the right people in the right places, but found themselves handicapped by an ignorance of the relative merit of various individuals in question. Perhaps some of you have faced a similar difficulty!

In the course of the effort to overcome these conditions, one branch by its own vote undertook this experiment in mutual rating. It was undertaken, I believe, partly in the hope of securing greater individual justice, but mostly from an instinctive desire for real participation, however crude the form might be.

"If the boss," they argued, "can't get at the truth about us, we'll do what we can to help. We know each other better than he does. Perhaps he won't agree with our judgment, or act on it, but at least he'll learn something and so will we!"

So the branch undertook to determine the relative standing of its members in certain qualities of merit, such as personality (ability and industry were added later). Every member of the branch was entitled to vote on every other member. The vote was taken by secret ballot, and the judgment expressed in percentage of the scale of 100. The average of all votes cast on any one person would be the collective judgment or "mutual rating." A tabulation of all the ratings would give a sort of "score card" in which each individual could find his name and relative standing in the list. Successive ratings would give each one a chance to improve his "score."

In the development of any technic, mistakes are quite as significant as successes. The form of the first mutual rating ballot is an example (Fig. 1).



NAME OF PERSON RATED

RATING %

TITLE

I AM OF HIGHER RANK

DIVISION

(CROSS OUT TWO) EQUAL -

SECTION

LOWER -

BRANCH

UNIT

MUTUAL RATING BALLOT

U.S.S.B. – E.F.C.

IN DIVISION

DATE MO. DAY 191

FIG. 1

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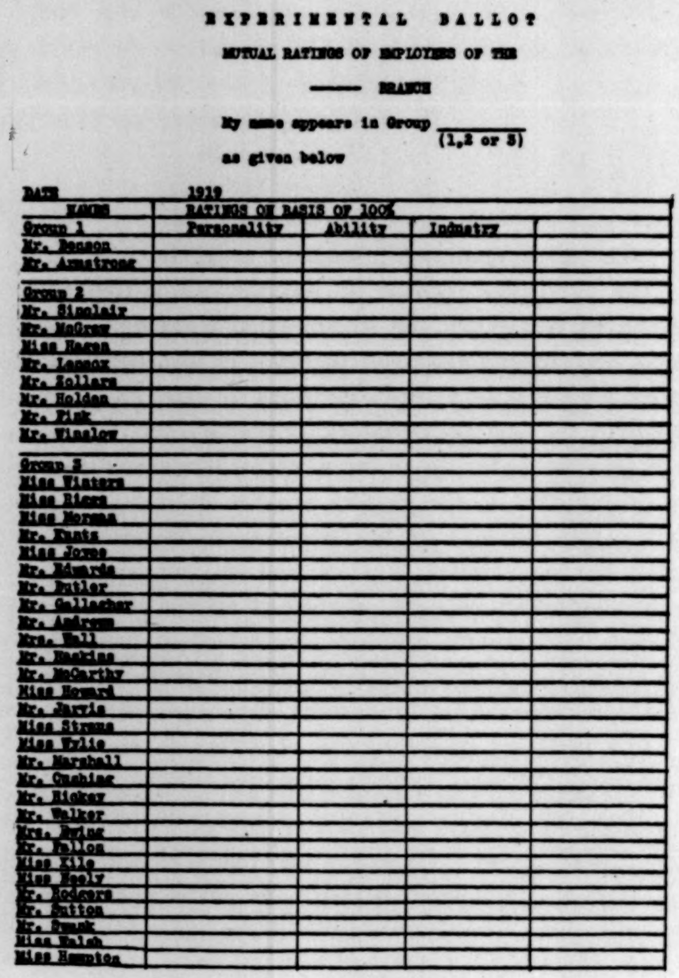
[1] Paper presented at the annual meeting of the Taylor Society, New York, Dec. 6, 1919.

[2] Consulting Engineer in Management, Philadelphia, Pa.

The rater was to indicate whether he was of higher, equal or lower rank than the person being voted on. You see they were expressing judgment not only downward on those of lower rank, which is the ordinary way, but also sidewise on those of equal rank and upward on those of higher rank.

This form failed for the reason that if you were rating your superior, John Jones, you might easily, as some did, cross out the wrong two ranks, (e. g. equal and lower) indicating that you were of higher rank than John Jones, instead of the reverse. That little difficulty led to the fact that five votes were cast showing that the voters were of higher rank than the head of the branch! However, instead of pointing out to the group where they had made their mistake, the tabulations were made up strictly according to the ballots, because we had promised the group that they would have the actual result of their own effort. When the group saw that five of them had indicated that they were of higher rank than the head of the branch, they said "this doesn't count for anything," and it didn't. So they set about correcting their own mistake. The reason I have shown you this mistake first is to remind you that where a group can correct its own mistake, it is far more educational than where the mistake is corrected for them. All the way through I hope you will recognize at work the principle that growth cannot be achieved *for* people; it must be achieved *by* them. That is the whole reason for participation of every kind.



EXPERIMENTAL BALLOT

MUTUAL RATINGS OF EMPLOYEES OF THE

—— BRANCH

My name appears in Group ______ (1,2 or 3)

as given below

DATE 1919

NAMES	RATINGS ON BASIS OF 100%			
Group 1	Personality	Ability	Industry	
Mr. Benson				
Mr. Armstrong				
Group 2				
Mr. Sinclair				
Mr. McGrew				
Miss Hagen				
Mr. Lennox				
Mr. Zollars				
Mr. Holden				
Mr. Fink				
Mr. Winslow				
Group 3				
Miss Winters				
Miss Riggs				
Miss Morgan				
Mr. Kuntz				
Miss Jones				
Mr. Edwards				
Mr. Butler				
Mr. Gallagher				
Mr. Andrews				
Mrs. Wall				
Mr. Haskins				
Mr. McCarthy				
Miss Howard				
Mr. Jarvis				
Miss Strauss				
Miss Wylie				
Mr. Marshall				
Mr. Cushing				
Mr. Hickey				
Mr. Walker				
Mrs. Ewing				
Mr. Fallon				
Miss Kile				
Miss Neely				
Mr. Rodgers				
Mr. Sutton				
Mr. Swank				
Miss Walsh				
Miss Hampton				

FIG. 2

The revised ballot (Fig. 2) which they devised corrected this mistake, and also simplified the voting process. You will notice the first ballot had a place for the name of only one person to be rated; which meant if you were rating twenty people you had to make out twenty ballots. In the revised form were listed on a single ballot all the names in the branch divided into three groups according to official rank. In the original revised form the names in each group were arranged alphabetically. (By a mistake the alphabetical arrangement was not maintained when fictitious names were substituted.) The two in Group 1 were the head of the branch (Mr. Armstrong), and his assistant (Mr. Benson) who would correspond to the superintendent and assistant superintendent in an ordinary shop.

Those in Group 2, so-called "unit heads," would correspond to shop foremen; Group 3 consisted of the non-executive employees. The names were divided into these three groups in order that the tabulator, by noting in which group the voter stated he belonged, could sort the votes on each individual into those of higher, equal and lower ranks, as well as get the consensus of all ranks combined. Also, while on the first ballot they had voted on personality alone, on this they added two more qualities, viz., ability and industry. To guard against individual votes becoming known, the group decided that someone outside the group should attend to counting and tabulating the ballots. This was done.

The first rating on the revised ballot was taken March 4, 1919. Table I (insert) is a copy of the complete tabulation, which was reproduced by photostat and a copy given to every member of the group. The psychological value of such publicity of results will become increasingly evident. You will notice that all three qualities were grouped on a single sheet. The names were listed under each quality in the order of their relative standing in the total collective judgment, irrespective of official rank. The first column under each quality shows the relative standing, the second the official rank (Group 1, 2, or 3), the third the name, the fourth the number of "estimators," and the fifth the total collective judgment, or "average" rating in per cent. The following columns show the number of estimators in each rank voting on the individual, and their respective estimates.

Let us examine a few of the more significant indications on these tabulations—significant equally, I hold, to the employer who wants to give a square deal and to the employee who wants to get one.

Many have asked: "Won't personal prejudice entirely govern the rating? Will not the idea in regard to a person's personality determine our idea in regard to his ability and his industry?" Well, let us look at the ratings of two men in this March 4 tabulation (Table 1). Mr. Benson, who was the assistant head of the branch, stands third in personality, twenty-fifth in ability and twenty-ninth in industry. Personal liking didn't do a great deal to maintain Mr. Benson's prestige when it came to judging his ability and industry! Now take the case of Mr. Zollers, standing thirty-seventh (third from the bottom) in personality, eighteenth in ability, and twenty-second in industry. I shall not describe the gentleman but you can draw your own conclusions. Briefly you get it this way: Mr. Benson was rated high in personality, low in ability, and lower in industry; as much as to say "he is a good enough fellow, but we don't think much of his ability, and he is lazy." On the contrary, Mr. Zollers was rated low in personality. He was not popular but they recognized his ability and industry and gave him credit for it.

An important consideration from an organization point of view, is the light a rating of this kind throws on conflicting judgments. You who are executives, think of the value to you to know the consensus of judgment of those below you on each individual no matter what his rank; how it would help you to find the right man and not make serious mistakes; and how, at least, it would open your eyes and make you think twice before taking definite action!

Who knows a man best, his superiors, his equals or his subordinates? Who knows him *best,* perhaps, cannot be finally decided; but, certainly, no one of the groups knows him completely. Before you can get the whole truth on which to promote a man, should you not get all three points of view about him, provided you can get them in a way that is fair, open, and above board?

Look at these cases of conflicting judgment. Twenty-three persons rated Mr. Kuntz (standing thirty) 74.13 in personality. Seven of those were his superiors in rank and rated him 84.57; sixteen equals rated him 70.18. Contrast Mr. Kuntz, who was rated by his superiors almost fifteen per cent higher than by his equals in rank, with Mr. Butler (standing nineteen) who was rated about ten per cent lower by his superiors than by his equals in rank.

Under ordinary conditions, if the "boss," the appointing officer, were debating between Mr. Kuntz and Mr. Butler for a promotion depending primarily on "personality," he would take Mr. Kuntz. But with a rating of this sort before him he would at least be inclined to pause and consider: "The fact that 'the crowd', sixteen of them, average fifteen per cent lower than we, his seven superiors, must mean that the crowd has something on Mr. Kuntz that we don't know about. I think I'll not risk a misstep until we know more. The crowd seems to think more of Mr. Butler than we do. Perhaps Mr. Butler has some strong qualities which the crowd recognizes and which we have not yet found out. Altogether, it is clear we need to go further into the situation."

Mr. Winslow, standing ten in personality, has 84.50 as the average of thirty votes cast. His two superiors rate him at 85; seven of equal rank rate him at 72.85, and twenty-two subordinates in rank rate him at 88.33. In other words, his superiors and his subordinates rate him high and he is not liked by his equals in rank. Those interested in following these three cases further will see that in ability and industry also, their ratings show similarly conflicting judgments.

No one rating, obviously, could be considered conclusive or final. Mr Winslow or Mr. Kuntz or Mr. Butler—none of these men could be tagged as belonging forever in the particular relative standing in which we see them here. Remember, this was the very first effort of a group of forty employees in a big organization to undertake this self-determined problem of mutual appraisal. Naturally, there were many things which might be revised later, including their estimates of each other. They didn't know each other as well as they would later when their sense of responsibility had grown with use. So a vital essential in ratings of any sort is that they be periodic. I expect to see the day when mutual ratings will be as regularly periodic and as much a matter of course in well conducted industry as the expense analysis is today.

On the periodicity of the ratings depends their self-correctiveness. If the crowd on seeing this tabulation feels that Mr. Kuntz is too low or someone else is too high, they will correct it next time.

Mr. Benson, you remember, was third in personality in the first rating of March 4. In the rating five weeks later he is nineteenth (Table 2). I can't tell you just why that occurred. That is only illustrative of a great many ups and downs in the ratings. It may be that Mr. Benson felt a bit "peeved" that the crowd rated him so low in ability and industry, and showed it. Anyhow, you see what the crowd did!

Let me give you another case that is a little more cheerful. In industry, we see Mrs. Wall in thirtieth place (Table 1). On April 10th, five weeks later (Table 2), Mrs. Wall has risen to eighteenth place in the judgment of her fellow-workers of all ranks. You see this thing has the elements of a fine sort of game. An individual can improve his score at will by simply getting busy and improving himself and showing his fellow-workers what he has in him, letting the best come out, instead of keeping it concealed.

I want to show you a consistent rise right through. Comparing the two tabulations (Tables 1 and 2), Mr. Winslow rose from tenth to second in personality; from eighth to second in ability, and from fifth to first in industry; whereas Miss Morgan dropped from seventh in personality to eighteenth, from seventh in ability to nineteenth, and from nineteenth in industry to twenty-fourth. I am only picking out some high spots, but you can see that a crowd of forty knowing each other would find a great deal of illumination in these judgments. The above illustrations are summarized in Table III.

TABLE III

SPECIMEN ANALYSES OF TABULATION

P—Personality; A—Ability; I—Industry

DISCRIMINATING JUDGMENTS MARCH 4

Mr. Benson	3 P, 25 A, 29 I
Mr. Zollers	37 P, 18 A, 22 I

CONFLICTING JUDGMENTS BY DIFFERENT RANKS MARCH 4

Mr. Kuntz	30 P, 35 A, 33 I	High by superiors.
Mr. Butler	19 P, 11 A, 14 I	Low by superiors.
Mr. Winslow	10 P, 8 A, 5 I	High by superiors and subordinates.

SELF CORRECTIVENESS

	MARCH 4		*APRIL* 10
Mr. Benson	3 P	drops to	19 P
Mrs. Wall	30 I	rises to	18 I
Mr. Winslow	10 P, 8 A, 5 I,	rises to	2 P, 2 A, 1 I
Miss Morgan	7 P, 7 A, 19 I,	drops to	18 P, 19 A, 24 I

Once you start any game which you enjoy, you want to improve your game. I have never seen a golfer yet who wasn't consistent in that respect. I believe it is inherent in human nature. The beginnings of this rating game were rather crude and the three qualities chosen were picked more or less at random. When the crowd saw the first tabulation (of March 4), they began to question in their own minds and of each other: "What did we mean by personality, ability and industry?"

It was *their* game; what did they do? They appointed their own committee to draw up definitions. The following is a copy:

> The Advisory Committee of the Group Organization of the ———Branch Employees met Tuesday afternoon, April 1st, 1919, in the Basement File Room and adopted the following definitions of the terms:

INDUSTRY	Habitual diligence and attention to work, including regularity and punctuality.
ABILITY	Skill displayed in performance of your job and in obtaining results.
PERSONALITY	That which constitutes a person's individuality; his everyday disposition toward his work and his co-workers, superiors or subordinates.

(Signed) C. M. HOLDEN,
Secretary Pro. Tem.

These are not dictionary definitions, but working definitions, drawn up by the group itself and distributed to each member. They are an indication of the desire to refine and improve the game, a desire to which I know no limit.

You will recognize that we have been dealing with absolutely impersonal averages. Where there is only one estimator in a particular rank, as in Group 1, the average estimate is not shown in the tabulations. It takes two or more estimates to make an average and so keep the ratings impersonal. It might be embarrassing, if not actually unsafe for me, to have you know exactly what I think of you. Perhaps you feel much the same way! Moreover, a collective is probably truer than an individual judgment, because prejudices, which play a part in all of our individual judgments, would tend to neutralize each other.

TABLE I TABULATION OF

MUTUAL RATINGS OF——BRANCH EMPLOYEES
AS OF MARCH 4, 1919.

(Where there is only one estimator in a particular rank, the "average estimate" is not shown; an "average" must be the result of two or more estimates, in order that no individual's estimate may be known. The names are arranged in order, beginning with the highest total average rating.)

PERSONALITY

Standing	Group	Name	Total Estimators	Total Average Rating	No. Est. Higher Rank	Average Estimate	No. Est. Equal Rank	Average Estimate	No. Est. Lower Rank	Average Estimate
1	1	Mr. Armstrong	31	88.93	—	—	—	—	31	88.93
2	3	Miss Joyce	14	87.50	7	87.55	7	87.28	—	—
3	1	Mr. Benson	32	87.50	—	—	—	—	32	87.50
4	3	Mr. Andrews	23	86.86	9	86.66	14	87.	—	—
5	3	Miss Hampton	12	86.16	6	85.50	6	86.33	—	—
6	2	Miss Hagen	30	86.13	2	85.	6	80.83	22	87.68
7	3	Miss Morgan	13	85.61	6	84.16	7	86.85	—	—
8	3	Miss Neely	27	85.52	9	80.88	18	87.83	—	—
9	3	Mr. Haskins	19	84.73	6	83.33	13	85.38	—	—
10	2	Mr. Winslow	30	84.50	2	85.	7	72.85	21	88.33
11	3	Mr. Sutton	17	84.30	6	80.50	11	86.36	—	—
12	3	Mrs. Ewing	16	83.87	8	85.25	8	82.50	—	—
13	3	Miss Kile	26	83.19	8	81.87	18	83.77	—	—
14	3	Mr. McCarthy	18	83.06	6	85.	12	82.08	—	—
15	3	Miss Winters	13	82.30	6	81.66	7	82.85	—	—
16	2	Mr. McGrew	25	81.80	2	85.	5	87.	18	80.
17	3	Mr. Jarvis	17	81.47	8	86.25	9	77.22	—	—
18	2	Mr. Sinclair	25	81.25	2	87.50	7	73.75	15	84.
19	3	Mr. Butler	16	81.18	6	74.83	10	85.	—	—
20	3	Miss Straus	17	80.53	7	77.	10	83.	—	—
21	3	Miss Walsh	13	80.	6	83.83	7	76.86	—	—
22	3	Mr. Rodgers	23	79.83	9	83.44	14	77.50	—	—
		Total Average	840	79.83						
23	3	Miss Riggs	30	78.93	10	75.50	20	80.65	—	—
24	3	Mr. Swank	29	78.89	9	78.33	20	79.15	—	—
25	2	Mr. Fink	27	77.81	2	75.	7	80.	18	77.27
26	3	Mr. Cushing	24	77.79	9	72.44	15	81.	—	—
27	3	Mr. Hickey	18	76.11	8	74.38	10	77.50	—	—
28	2	Mr. Lennox	30	75.70	2	85.	7	76.42	21	74.57
29	3	Mrs. Wall	19	75.	8	81.25	11	70.45	—	—
30	3	Mr. Kuntz	23	74.13	7	84.57	16	70.18	—	—
31	3	Miss Howard	16	74.44	8	77.88	8	71.	—	—
32	3	Mr. Marshall	25	74.33	9	77.70	16	72.37	—	—
33	3	Mr. Fallon	16	74.12	8	75.	8	73.25	—	—
34	3	Miss Wylie	15	73.33	7	80.	8	67.50	—	—
35	3	Mr. Walker	21	73.09	7	65.71	14	76.71	—	—
36	3	Mr. Gallagher	19	72.89	7	78.57	12	69.58	—	—
37	2	Mr. Zollars	28	72.88	2	75.	6	73.33	20	72.88
38	2	Mr. Holden	30	72.66	2	85.	6	83.33	22	68.63
39	3	Mr. Edwards	14	68.57	6	74.16	8	64.37	—	—

MUTUAL RATINGS OF——

(Where there is only one estima
"average estimate" is not shown;
sult of two or more estimates, in
timate may be known. The name
ginning with the highest total ave

ABILITY

Standing	Group	Name	Total Estimators	Total Average Rating
1	1	Mr. Armstrong	30	92.20
2	3	Mr. Sutton	16	89.06
3	3	Miss Hampton	12	87.50
4	2	Miss Hagen	28	87.10
5	2	Mr. Sinclair	22	86.82
6	3	Mr. McCarthy	16	86.13
7	3	Miss Morgan	12	85.25
8	2	Mr. Winslow	28	85.
9	3	Miss Joyce	13	84.15
10	3	Mr. Haskins	19	83.84
11	3	Mr. Butler	16	83.43
12	3	Miss Neely	25	83.36
13	3	Mr. Jarvis	17	83.33
14	3	Mr. Andrews	18	83.
15	3	Miss Winters	13	82.30
16	3	Mr. Rodgers	22	82.18
17	2	Mr. Fink	24	81.83
18	2	Mr. Zollars	25	81.60
19	3	Mrs. Ewing	15	81.33
20	3	Miss Straus	17	81.17
21	3	Miss Walsh	14	80.93
22	2	Mr. McGrew	22	80.81
23	3	Mr. Cushing	22	80.81
		Total Average	774	80.72
24	3	Miss Kile	24	80.66
25	1	Mr. Benson	30	79.90
26	2	Mr. Lennox	27	79.40
27	3	Miss Riggs	27	79.15
28	3	Mr. Swank	24	78.87
29	3	Mr. Marshall	23	77.87
30	3	Mr. Walker	19	75.68
31	3	Mrs. Wall	17	75.17
32	3	Miss Howard	15	74.86
33	2	Mr. Holden	25	74.48
34	3	Mr. Fallon	14	73.94
35	3	Mr. Kuntz	19	72.94
36	3	Mr. Hickey	16	72.50
37	3	Mr. Gallagher	19	71.36
38	3	Mr. Edwards	14	68.21
39	3	Miss Wylie	14	67.14

TABLE II. TABULATION OF

MUTUAL RATINGS OF——BRANCH EMPLOYEES
AS OF APRIL 10, 1919.

(Where there is only one estimator in a particular rank, the "average estimate" is not shown; an "average" must be the result of two or more estimates, in order that no individual's estimate may be known. The names are arranged in order, beginning with the highest total average rating.)

PERSONALITY

Standing	Group	Name	Total Estimators	Total Average Rating	No. Est. Higher Rank	Average Estimate	No. Est. Equal Rank	Average Estimate	No. Est. Lower Rank	Average Estimate
1	3	Miss Joyce	10	86.20	6	89.50	4	81.25	—	—
2	2	Mr. Winslow	24	86.17	2	91.	5	86.	17	85.65
3	1	Mr. Armstrong	23	84.69	—	—	—	—	23	84.69
4	2	Miss Hagen	23	83.60	2	90.	4	81.25	17	83.41
5	3	Miss Hampton	7	83.57	5	83.	2	85.	—	—
6	3	Mr. Haskins	17	83.11	6	82.16	11	83.64	—	—
7	3	Miss Riggs	22	82.59	7	75.57	15	85.87	—	—
8	3	Miss Neely	21	82.29	5	84.60	16	81.56	—	—
9	3	Mr. McCarthy	16	82.17	6	80.83	10	83.	—	—
10	2	Mr. McGrew	22	81.59	2	89.50	4	86.25	16	79.44
11	3	Miss Howard	12	81.50	7	79.71	5	84.	—	—
12	3	Mr. Andrews	18	80.83	7	81.28	11	80.55	—	—
13	2	Mr. Sinclair	21	80.48	2	88.50	5	79.	14	79.86
14	3	Mr. Jarvis	14	79.85	6	85.50	8	75.62	—	—
15	3	Mr. Sutton	17	79.71	6	77.50	11	80.91	—	—
16	3	Miss Winters	7	79.	4	82.	3	75.	—	—
17	3	Mr. Rodgers	17	79.	7	79.71	10	78.50	—	—
18	3	Miss Morgan	8	78.75	6	81.67	2	70.	—	—
		Total Average	567	78.35	159	79.81	253	77.12	155	78.89
19	1	Mr. Benson	23	78.30	—	—	—	—	23	78.30
20	3	Mr. Cushing	16	77.81	5	75.00	11	79.09	—	—
21	3	Miss Straus	17	77.50	5	78.	11	77.27	—	—
22	2	Mr. Fink	20	76.35	2	80.	4	78.75	14	75.14
23	3	Mrs. Wall	12	75.83	5	77.	7	75.	—	—
24	3	Miss Walsh	11	75.73	5	76.	6	75.50	—	—
25	3	Mr. Walker	18	75.11	5	75.40	13	75.	—	—
26	3	Mr. Butler	16	74.69	7	73.57	9	75.56	—	—
27	3	Mr. Kuntz	20	73.40	6	80.	14	70.57	—	—
28	3	Mr. Marshall	19	73.21	7	78.57	12	70.08	—	—
29	3	Mr. Hickey	18	72.	5	71.	13	72.69	—	—
30	2	Mr. Zollars	24	71.79	2	75.	5	70.	17	71.94
31	3	Mr. Gallagher	11	71.36	5	78.	6	65.83	—	—
32	3	Mr. Fallon	13	70.85	6	75.12	7	67.14	—	—
33	3	Miss Wylie	11	70.45	6	78.33	5	61.	—	—
34	2	Mr. Holden	20	69.25	2	90.	4	66.25	14	67.14

MUTUAL RATINGS O

(Where there is only one es
"average estimate" is not sho
sult of two or more estimates
timate may be known. The
ginning with the highest total

Standing	Group	Name	Total Estimators	Total Average Rating
1	1	Mr. Armstrong	23	88.8
2	2	Mr. Winslow	24	87.3
3	2	Mr. Sinclair	21	86.24
4	3	Miss Joyce	10	85.00
5	3	Miss Hampton	7	85.
6	3	Mr. McCarthy	14	84.29
7	3	Mr. Sutton	16	83.93
8	2	Miss Hagen	21	82.76
9	2	Mr. Fink	20	81.70
10	3	Mr. Haskins	16	81.
11	3	Miss Winters	7	81.5
12	3	Miss Neely	20	81.4
13	3	Mr. Andrews	18	81.3
14	3	Miss Howard	12	80.8
15	2	Mr. McGrew	21	80.7
16	3	Miss Straus	15	80.66
17	3	Mr. Rodgers	16	79.93
		Total Average	549	78.9
18	3	Mr. Jarvis	14	78.64
19	3	Miss Morgan	8	78.12
20	3	Miss Walsh	11	77.5
21	1	Mr. Benson	21	77.04
22	2	Mr. Zollars	23	76.56
23	3	Mr. Marshall	18	76.44
24	3	Miss Riggs	22	76.27
25	3	Mr. Walker	17	75.88
26	3	Mr. Gallagher	11	75.45
27	3	Mrs. Wall	12	75.25
28	3	Mr. Cushing	16	73.69
29	3	Mr. Butler	16	73.12
30	2	Mr. Holden	19	73.05
31	3	Mr. Kuntz	19	70.94
32	3	Miss Wylie	11	69.54
33	3	Mr. Hickey	18	68.05
34	3	Mr. Fallon	12	66.66

F MUTUAL RATINGS—MARCH 4

F— NCH EMPLOYEES
S OF MARCH 4, 1919.

estima n a particular rank, the own; average" must be the re- s, in r that no individual's es- name e arranged in order, be- l ave rating.)

BILITY

otal erage ating	o. st. her nk	Average Estimate	No. Est. Equal Rank	Average Estimate	No. Est. Lower Rank	Average Estimate
92.20		—	—	—	30	92.20
89.06		86.66	10	90.50	—	—
87.50		89.16	6	86.16	—	—
87.10	2	91.	6	81.33	21	88.30
86.82	2	92.50	7	87.14	13	85.77
86.1		88.60	11	85.	—	—
85.25		85.	6	85.50	—	—
85.		90.	7	75.	19	88.10
84.15		85.71	6	82.33	—	—
83.84		82.50	13	84.46	—	—
83.43		78.33	10	86.50	—	—
83.36		75.37	17	87.11	—	—
83.33		88.12	9	79.44	—	—
83.		83.22	9	83.22	—	—
82.30		84.66	7	80.28	—	—
82.18	9	87.55	13	78.46	—	—
81.83	2	87.50	6	78.83	16	82.37
81.60	2	86.50	6	82.17	17	80.82
81.33	8	85.	7	77.14	—	—
81.17	7	78.57	10	83.	—	—
80.9	6	85.	18	77.87	—	—
80.81	8	90.	5	81.60	15	79.83
80.8	7	79.28	15	81.53	—	—
80.72						
80.66	7	80.	17	82.12	—	—
79.90	—	—	—	—	30	79.90
79.4	2	87.50	7	81.42	18	77.72
79.15	10	72.40	17	83.12	—	—
78.87	8	78.12	16	79.25	—	—
77.87	9	81.66	14	75.43	—	—
75.68	7	69.	12	79.58	—	—
75.17	6	81.33	11	71.81	—	—
4.86	8	74.25	17	73.19	—	—
4.48	2	90.	6	83.33	17	63.64
3.94	7	75.	7	72.85	—	—
2.94	6	85.17	13	67.92	—	—
72.50	7	72.14	9	72.77	—	—
71.36	7	74.	12	70.	—	—
8.21	6	74.16	8	63.75	—	—
7.14	7	67.86	7	66.43	—	—

MUTUAL RATINGS OF——BRANCH EMPLOYEES
AS OF MARCH 4, 1919.

(Where there is only one estimator in a particular rank, the "average estimate" is not shown; an "average" must be the result of two or more estimates, in order that no individual's estimate may be known. The names are arranged in order, beginning with the highest total average rating.)

INDUSTRY

Standing	Group	Name	Total Estimators	Total Average Rating	No. Est. Higher Rank	Average Estimate	No. Est. Equal Rank	Average Estimate	No. Est. Lower Rank	Average Estimate
1	1	Mr. Armstrong	29	91.10	—	—	—	—	29	91.10
2	3	Mr. Sutton	16	89.56	6	88.83	10	90.	—	—
3	3	Miss Winters	13	87.61	6	91.32	7	84.42	—	—
4	2	Mr. McCarthy	17	87.12	5	90.20	12	85.83	—	—
5	2	Mr. Winslow	30	86.66	2	92.50	8	79.37	20	89.
6	3	Miss Hampton	12	86.50	6	88.50	6	84.50	—	—
7	2	Mr. Sinclair	21	85.47	2	92.50	7	82.14	12	86.25
8	2	Miss Hagen	22	85.37	2	85.	6	78.83	19	87.47
9	3	Mr. Rodgers	20	84.29	9	89.44	12	80.41	—	—
10	3	Mr. Jarvis	17	84.	8	87.87	9	80.55	—	—
11	3	Miss Walsh	14	83.78	6	86.66	8	81.63	—	—
12	3	Miss Neely	24	83.71	8	76.25	16	87.44	—	—
13	3	Mr. Haskins	19	83.68	6	82.50	13	84.23	—	—
14	3	Mr. Butler	16	82.81	6	76.66	10	86.50	—	—
15	3	Mrs. Ewing	15	82.47	8	88.75	7	75.28	—	—
16	3	Mr. Andrews	18	82.33	9	85.	9	79.66	—	—
17	3	Miss Joyce	13	81.92	7	83.28	6	80.33	—	—
18	2	Mr. McGrew	19	81.84	2	90.	5	82.	12	80.41
19	3	Miss Morgan	12	81.75	6	79.16	6	84.33	—	—
20	3	Miss Kile	23	81.61	7	80.	16	82.31	—	—
21	3	Miss Straus	17	81.47	7	82.14	10	81.	—	—
22	2	Mr. Zollars	23	81.22	2	92.50	6	79.17	15	80.53
		Total Average	747	81.21						
23	3	Mr. Cushing	21	80.	7	80.	14	81.64	—	—
24	2	Mr. Fink	24	79.71	2	77.50	6	74.66	16	81.87
25	3	Mr. Marshall	22	78.91	9	84.22	13	75.23	—	—
26	2	Mr. Lennox	26	78.88	2	87.50	7	80.71	17	77.11
27	3	Mr. Swank	24	78.79	8	77.50	16	79.43	—	—
28	3	Miss Riggs	27	78.52	10	71.70	17	82.53	—	—
29	1	Mr. Benson	28	77.46	—	—	—	—	28	77.46
30	3	Mrs. Wall	16	75.43	6	83.33	10	70.70	—	—
31	3	Mr. Gallagher	17	75.29	7	79.28	10	72.50	—	—
32	3	Mr. Hickey	15	74.07	7	74.28	8	73.88	—	—
33	3	Mr. Kuntz	19	73.57	6	83.32	13	69.07	—	—
34	3	Mr. Walker	18	73.33	7	67.14	11	78.18	—	—
35	3	Mr. Fallon	12	73.16	6	74.16	6	72.16	—	—
36	2	Mr. Holden	25	70.84	2	92.50	6	80.83	17	69.70
37	3	Miss Howard	15	70.33	8	75.63	7	64.28	—	—
38	3	Mr. Edwards	14	69.64	6	75.83	8	65.	—	—
39	3	Miss Wylie	13	69.08	6	79.17	7	60.43	—	—

F MUTUAL RATINGS—APRIL 10

OF—BRANCH EMPLOYEES
AS OF APRIL 10, 1919.

e estimator in a particular rank, the shown; an "average" must be the re- ates in order that no individual's es- he names are arranged in order, be- otal average rating.)

ABILITY

l ge g	No. Est. Higher Rank	Average Estimrte	No. Est. Equal Rank	Average Estimate	No. Est. Lower Rank	Average Estimate
8.87	—	—	—	—	23	88.87
7.33	2	92.50	5	88.	17	86.53
5.24	2	92.50	5	85.60	14	85.57
5.00	6	86.66	4	82.50	—	—
5.	5	85.	2	85.	—	—
4.29	5	86.40	9	83.11	—	—
3.93	6	83.	10	84.50	—	—
2.76	2	92.50	4	77.50	15	82.87
1.70	2	91.50	4	83.50	14	79.79
1.6	6	78.50	10	83.50	—	—
.57	4	85.25	3	76.66	—	—
.40	5	82.60	15	81.	—	—
.31	7	81.14	11	81.45	—	—
.81	7	80.71	5	81.	—	—
.76	2	90.	4	77.50	15	80.40
.66	5	82.	10	80.	—	—
.93	7	82.	9	78.33	—	—
.96	158	80.63	243	76.53	148	81.18
.64	6	83.	8	75.37	—	—
.12	6	80.83	2	70.	—	—
.54	5	79.	6	76.33	—	—
.04	—	—	—	—	21	77.04
.56	2	89.	5	73.	16	76.12
.44	7	79.	11	74.82	—	—
.27	7	71.43	15	78.53	—	—
.88	5	75.	12	76.25	—	—
.45	5	82.	6	70.	—	—
.25	5	79.60	7	72.14	—	—
.69	5	74.60	11	73.18	—	—
.12	7	75.71	9	74.44	—	—
.05	2	91.	4	76.25	13	69.31
.94	6	78.	13	67.69	—	—
.54	6	77.50	5	60.	—	—
.05	5	69.	13	67.69	—	—
.66	6	75.	6	58.33	—	—

MUTUAL RATINGS OF——BRANCH EMPLOYEES
AS OF APRIL 10, 1919.

(Where there is only one estimator in a particular rank, the "average estimate" is not shown; an "average" must be the result of two or more estimates, in order that no individual's estimate may be known. The names are arranged in order, beginning with the highest total average rating.)

INDUSTRY

Standing	Group	Name	Total Estimators	Total Average Rating	No. Est. Higher Rank	Average Estimate	No. Est. Equal Rank	Average Estimate	No. Est. Lower Rank	Average Estimate
1	2	Mr. Winslow	24	87.21	2	93.50	5	91.	17	85.35
2	2	Mr. Sinclair	21	86.24	2	93.50	5	90.80	14	83.57
3	3	Mr. McCarthy	14	84.14	5	85.60	9	83.33	—	—
4	3	Mr. Sutton	15	83.66	6	76.67	9	88.33	—	—
5	1	Mr. Armstrong	22	83.18	—	—	—	—	22	83.18
6	3	Miss Joyce	10	83.	6	85.	4	80.	—	—
7	3	Mr. Haskins	16	82.19	6	80.	10	83.50	—	—
8	3	Miss Hampton	7	82.14	5	81.	2	85.	—	—
9	3	Miss Neely	20	81.50	5	80.	15	82.	—	—
10	3	Miss Winters	7	81.43	4	85.	3	76.67	—	—
11	2	Miss Hagen	21	80.33	2	90.	4	76.25	15	80.20
12	3	Miss Straus	15	80.33	5	81.	10	80.	—	—
13	3	Mr. Jarvis	14	80.14	6	84.50	8	76.87	—	—
14	3	Miss Howard	12	80.	7	78.57	5	82.	—	—
15	3	Mr. Rodgers	16	79.81	7	83.14	9	77.22	—	—
16	2	Mr. McGrew	21	79.33	2	90.	4	80.	15	77.73
17	3	Mr. Andrews	18	79.22	7	79.	11	79.36	—	—
18	3	Mrs. Wall	12	78.75	5	83.	7	75.71	—	—
		Total Average	544	78.51	158	80.28	240	76.95	147	79.03
19	3	Miss Walsh	11	78.45	5	81.	6	76.33	—	—
20	2	Mr. Fink	20	78.10	2	82.50	4	80.	14	76.93
21	3	Mr. Cushing	15	77.33	5	75.	10	78.50	—	—
22	3	Mr. Marshall	18	77.	7	84.71	11	72.09	—	—
23	1	Mr. Benson	21	76.24	—	—	—	—	21	76.24
24	3	Miss Morgan	8	76.	6	77.17	2	72.50	—	—
25	2	Mr. Zollars	23	75.91	2	89.	5	75.	16	74.56
26	3	Mr. Walker	17	75.59	5	74.	12	76.25	—	—
27	3	Mr. Butler	16	75.50	7	76.14	9	75.	—	—
28	3	Mr. Gallagher	11	75.27	5	81.60	6	70.	—	—
29	3	Miss Riggs	22	74.77	7	70.71	15	76.67	—	—
30	2	Mr. Holden	19	73.26	2	90.	4	71.25	13	71.31
31	3	Mr. Hickey	16	71.25	5	75.	11	69.55	—	—
32	3	Mr. Kuntz	19	69.63	6	77.50	12	66.	—	—
33	3	Mr. Fallon	13	68.85	6	75.83	7	62.86	—	—
34	3	Miss Wylie	11	68.27	6	75.83	5	59.20	—	—

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Significant, too, is the growing conservatism. The average of all votes cast for all qualities March 4 was 80.50; five weeks later it was 78.60, a drop of nearly two per cent. Such growing conservatism is typical, I believe, wherever men are allowed actual participation.

The relative severity of judgments is interesting. Many people like to picture the executive as harsh in his judgment of subordinates. As a matter of fact, these figures show the executives as the most lenient of all. Those of all ranks on April 10 averaged 78.60; those of higher rank 80.24, those of lower rank 79.69, and those of equal rank 76.87, or almost three and one-half per cent below those of higher rank. In explanation I might suggest that those of higher rank when called upon to express themselves definitely about their subordinates think pretty well of them after all. They feel they would not keep subordinates unworthy of their confidence, therefore they rate them high. Those of lower rank closely approximate those of higher rank, perhaps out of a certain awe of the exalted higher positions and the qualities required for them,—an awe which upon more intimate acquaintance with those positions and their holders, generally fades away. And those of equal rank are the most severe. I believe it is true that our compeers of equal rank have fewer illusions about our jobs and our capacities than either those above us or below us. You can fool the boss easiest of all; you can't fool your subordinates as easily, and you can't fool your equals in the least!

TABLE IV

MUTUAL RATINGS

TOTAL AVERAGES

	MARCH 4	*APRIL* 10
ALL THREE QUALITIES	80.59	78.60
Personality	79.83	78.35
Ability	80.72	78.96
Industry	81.32	78.51

TOTAL AVERAGES RATING OF APRIL 10

	OF ALL RANKS	*OF HIGHER RANK*	*OF EQUAL RANK*	*OF LOWER RANK*
ALL THREE QUALITIES	78.60	80.24	76.87	79.69
Personality	78.35	79.81	77.12	78.89
Ability	78.96	80.63	76.53	81.18
Industry	78.51	80.28	76.95	79.03

In regard to the qualities there is another noteworthy point. Personality is the quality judged most severely by those both of higher and of lower ranks (79.81 and 78.89, Table IV), and ability by those of equal rank (76.53, Table IV). We seem to be most severe in our judgment of the personality of our subordinates and our superiors, but of the ability of our equals.

In thinking of the effects of these various facts on the members of the group and on the executives, please remember that the figures were absolutely open and available to all. Anyone could draw from them any conclusion he chose. There was no obligation incurred to abide by the results of the ratings in making promotion because, as I said before, they were "experimental!"

I have already alluded to the difficulties under which they were carried on. Perhaps the chief difficulty was a knowledge on the part of the force that the scheme was bitterly opposed by a number of superior executives who didn't want to have started any such ideas of participation, or of the right of subordinates to judge their superiors in any way. It was called "Bolshevism" and a few other pet names we nowadays give to ideas which we don't want to see grow. Many of the employees had reasonable grounds to fear that, if they participated in the ratings, it would be held against them by certain officials who some day might come into a position to exercise reprisals. In view of all this. do the results I am showing you not carry an added significance?

Table V shows you the same principle applied to a group of stenographers who, as a central group, served a number of individuals interchangeably. The first section shows a rating of stenographic ability by the stenographers themselves. Each of the seven stenographers was rated by the other six. The second section shows the stenographic ability of those same stenographers as rated by the dictators. Finally, in order to be completely fair and democratic we have in the third section the dictation ability of the dictators as rated by the stenographers. If you want to improve both your stenographic and dictation efficiency in your organization, start something like that! You'll be astonished at the results.

One more slide (Fig. 3) will show you the flexibility of mutual ratings. Mutual ratings was made a game, pure and simple, played at an informal dinner. Each participant is rated by the other participants in ability "to let George do it," "to blow his own horn," "to pass the buck," and "to raise the ante."

Each man had a rating ballot, signed his own name at the top, rated himself at the bottom and folded

TABLE V

STENOGRAPHIC ABILITY.

RATINGS OF FLOOR STENOGRAPHERS BY THEMSELVES AS OF FEB. 4, 1919

NAME	*NO. OF ESTIMATORS*	*AVERAGE ESTIMATE*
Spooner	6	94.83
Winston	6	94.83
Casey	6	94.50
Cooney	6	94.50
TOTAL	42	
AVERAGE		93.48
Murphy	6	92.33
Lodge	6	91.67
Roberts	6	91.67

STENOGRAPHIC ABILITY

RATINGS OF FLOOR STENOGRAPHERS BY FLOOR DICTATORS AS OF FEB. 6, 1919

NAME	*NO. OF ESTIMATORS*	*AVERAGE ESTIMATE*
Lodge	6	93.17
Roberts	6	90.50
Spooner	9	89.50
Winston	9	88.89
TOTAL	49	
AVERAGE		88.20
Murphy	4	86.38
Casey	6	86.00
Cooney	9	83.67

DICTATION ABILITY

RATINGS OF FLOOR DICTATORS BY FLOOR STENOGRAPHERS AS OF FEB. 4, 1919

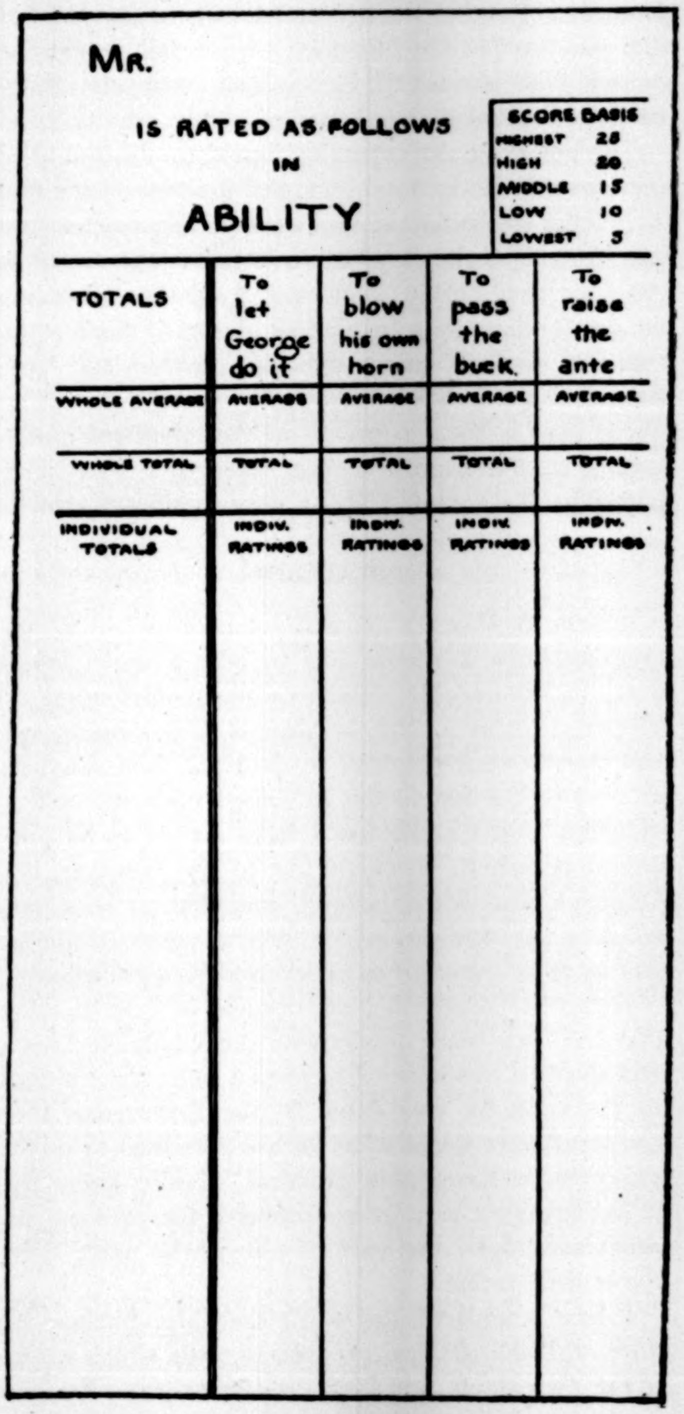
NAME	*NO. OF ESTIMATORS*	*AVERAGE ESTIMATE*
Hale	3	96.67
Thomas	2	96.50
Moore	4	96.25
Pryor	2	95.00
Babbitt	6	93.83
Upton	3	93.33
Cheney	3	93.00
Bolton	6	92.50
Wister	6	92.50
TOTAL	48	
AVERAGE		92.15
Smith	4	92.00
Wilbur	3	90.00
James	6	82.50

his self-rating under. Then each passed the ballot to his right-hand neighbor who wrote on the bottom his rating of Mr. ......, folded it under, and passed the ballot on. When each ballot came back to the original owner, he added up all of the totals, exclusive of his own judgment of himself, averaged them, and read aloud his judgment of himself as compared with the crowd's judgment of him. We had quite a lot of fun over it!

I hope very much that no one here will consider that this is a finished product in mutual rating technic; or that this is a package of goods which you can take home now and thereby get all of your employees to rate each other on personality, ability and industry. Ratings can be successfully developed "at home," however, provided a few fundamentals are borne in mind. This game to succeed must first of all be a game of the crowd itself that is playing it, as any game must be. The crowd itself must be interested, must develop its own rules, must determine the qualities which it wants to rate. It must be in every way "their game" if it is going to have its fullest possibilities. The technic must be self-determined by the raters. That is the only democratic way and the only way in which it will hold continuously the interest of the raters.

Secondly, it must be inclusive. There must be no privileged exemptions, of bosses or anybody else. If it is going to be fair, it has got to be fair for all alike. By that I don't mean that the laborers in the shop are to rate the president's financial ability. I mean we must apply straight through the exception principle, as we know it in scientific management. The ratings should be by homogeneous groups who know each other, rating only those qualities which they know about. Then, because from a homogeneous group, the collective judgment will count for something. You can conceive of the rating plan in a large organization pyramiding up with one pyramid on top of another, each pyramid representing one homogeneous group rating itself, including the bosses in that group. Let each unit or group or gang, or whatever you may call it in your own organization, including the foreman, be a pyramid; let the various foremen in each department and their superintendent be a pyramid; let the various superintendents in each plant, with their manager, be a pyramid; finally, let the managers and the executive officers be the topmost pyramid. By using the exception principle with judgment on some such ascending scale, you can apply the principle of mutual ratings to any organization, however large.

One of the weaknesses of these charts I have shown you is the fact that there are different numbers of people judging single individuals. I would personally rather have a rating of 79.50 by thirty people than 80 by fifteen people. If you stick to your homogeneous group you will get a greater unity of judgment. Of course, as in any balloting, a person is free to withhold his judgment about any person or quality.



MR.

IS RATED AS FOLLOWS
IN
ABILITY

SCORE BASIS	
HIGHEST	25
HIGH	20
MIDDLE	15
LOW	10
LOWEST	5

TOTALS	To let George do it	To blow his own horn	To pass the buck.	To raise the ante
WHOLE AVERAGE	AVERAGE	AVERAGE	AVERAGE	AVERAGE
WHOLE TOTAL	TOTAL	TOTAL	TOTAL	TOTAL
INDIVIDUAL TOTALS	INDIV. RATINGS	INDIV. RATINGS	INDIV. RATINGS	INDIV. RATINGS

FIG. 3

Another point is that it must be impersonal. That is why, when you have only two persons in a group, you omit their vote on each other. We don't want to know what one individual thinks about any other individual. There have to be two or more to strike an average, which is impersonal.

It should be simple,—so simple that the qualities are easily comprehended. We all of us have some idea of personality, of industry and of ability. Other qualities might just as well have been chosen. But they must be simple to be successfully rated. Therefore, start with too few rather than too many qualities. Remember you are playing one-o' cat. Someday you may grow to professional baseball. If so, it will not be at one leap, but by slow, gradual growth. Let the growth come naturally.

Another vital point that I have already suggested is the publicity of the results. If any employer here tries to work a rating scheme and keeps the tabulated records locked in his private safe, it will fall flat. The effectiveness of this thing as a game is the same as the effectiveness of the baseball score,—the greater the publicity the greater the fun and the interest.

And finally: I have already spoken of the periodicity; that no one rating is final. Have your ratings often enough to record any significant change of fact or judgment, and then you will get the rating functioning properly with its inherent property of self-correctiveness. Human beings, in common with all forms of life, must be free to grow, and growth involves self-correction through experience.

In regard to improvement in technic and possible lines of further development, don't forget for a minute that this is only one phase of sizing-up the individual. This isn't the whole man represented on the chart. We already have the production records of cost and quantity and quality of output. Those are fine. As a matter of fact, it may interest you to know that when we started these ratings in this particular group, after the first tabulation the crowd itself began to devise more effective production records than they had ever had in order to give them more *facts* on which to judge each other. When you get your own crowd working for scientific production records of its own output, you are getting somewhere with constructive organization! Out of this will grow the desire to define and weigh the qualities needed for different jobs. That, of course, leads to job-analysis and is educational, illuminating, and helpful to each employee in getting a broader vision of the organization and a feeling of contact with and understanding of the other fellow. After all, mutual ratings rest on the application in a different field of precisely the same principles as underlie the "progress records" so ably developed by Robert B. Wolf. To his pioneer work in opening up new channels of self-expression for the man on the job, as well as to his counsel during the development of mutual ratings, I am glad to acknowledge my indebtedness.

I think this particular rating plan could have been simplified, as several suggested later, by eliminating the percentages and simply listing the people in the order of relative standing. Then the smallest sum total would be the highest score.

Someone has also suggested the separation of men's and women's judgments. I am not sure about the wisdom of that. I hardly think that they are so distinctly different that they should be put into separate categories. I don't believe there are any more prejudices among women than among men, although we sometimes give them credit for a great many more.

In regard to the relation of these ratings to the professional psychological ratings, I have never seen in the latter anything which very particularly took hold of the individual employee as a stimulus to self improvement as mutual ratings do so markedly. Again, the employer in the psychological ratings doesn't get much enlightenment regarding the mental attitude of his employees, whereas here, he gets it full blast. The professional psychological ratings are expert, and in danger of complexity and artificiality, while these ratings are inexpert, very simple and very human. I don't mean to decry the expert ratings. I think they have done a tremendous service and should be continued; the more real scientific investigation we can have, the better, provided it is carried on with the right motive. But these ratings are so simple that they are inexpensive. Most important of all, they are self-corrective. I have never seen any of the expert psychological ratings which were progressively self-corrective from within.

I should like to talk a long time on the fundamental principles involved, including the justice of these ratings; but the time is getting short. We have called it "a contribution to the technic of participation." I owe that term with thanks to Morris Llewellyn Cooke. It seems to me that we cannot over-emphasize the importance of participation in our modern industrial life. But participation, like democracy, is a term which means nothing unless it is brought down to earth and put into practice. By the expression of our judgment of each other in an adequate, practical way, we are going to get somewhere. We have got to participate. I believe strongly, as I have said before, that judgments by people are far more productive than judgments for people. The autocratic point of view is to judge down and make the decision. The democratic point of view is for everybody to educate each other and ultimately make the decision together. After all, even in an autocracy, what happens when the collective judgment of the crowd takes a new slant? The Kaiser flees to Holland! In other words, sooner or later we all of us find our level in the judgment of our fellow-men, no matter what our activity, no matter what our attainment, according to our relative specific gravity.

The power of the expert is limited by the ability of the crowd to understand him, and it seems to me that we cannot do better than to start finding mechanisms and devising technics which will enable the crowd to grow by participation. And when I say that we cannot do better than to start finding these, I don't mean that we need to invent them at the top and hand them down. I didn't invent this rating plan. This rating plan is the out-growth of the interested participation of this branch in the Emergency Fleet Corporation. To my mind, it is a very significant growth.

DISCUSSION

ROBERT B. WOLF[1]: It will not take me three minutes, although I should like to take a much longer time, to discuss Mr. Shelton's fine contribution. I happened to be one of the victims of his rating system, for the stenographers on the tenth floor rated me as next to the last in the list based upon my skill at dictation. So I really feel I have a right to be prejudiced against it. I should like to say, however, that I believe that Mr. Shelton's contribution is a very valuable one, and one which will be appreciated more and more as we begin to understand its significance.

So far as I know, his contribution is the first effort that has been made to evaluate the intangible mental and spiritual qualities. I happened to be close enough to the work he was doing in the Emergency Fleet Corporation to know what he has presented to us this afternoon is thoroughly practical. I also know that it has operated as a great incentive for personal improvement upon the part of those who were doing the mutual rating.

I have compared the work that Mr. Shelton has done with the physical progress records which we use in our own plants, and I am sure the response has been just as keen, and the individual effort as sustained as when the effort is reflected in the actual changes made in materials.

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[1] Consulting Engineer, New York.

I can appreciate Mr. Shelton's remark that the men on the top called his plan "Bolshevism." Those of you who have had to handle operating superintendents know that any movement which seems to measure performance and tends in a way to correct their arbitrary judgments is looked upon with disfavor. The hardest industrial nut to crack today is the foreman, and I am greatly interested in this rating plan until we get something better, because it will surely eliminate personal opinion and prejudice by giving relative values to those apparently intangible mental and spiritual qualities.

In closing let me say that the plan seems to me to offer a very clean-cut, practical demonstration of how the ballot can be used effectively. Few of us realize how little effect our political balloting has upon our real living conditions. It is the working industrial environment which really governs and not the political environment.

REVIEW

Principles of Industrial Organization. Second Edition. By Dexter S. Kimball, A.B., M.E. (New York: McGraw-Hill. 1919. pp. 300).

In setting forth so clearly and so lucidly the inception and progress of the principles involved in industrial organization from its original to its present relatively high scientific state, the author has rendered a true service to all persons interested in the practical application of those principles to present day industry. The detail structure of the book, with respect to arrangement, sequence, and relative importance of the essential phases of modern industrial organization and operation, emphasizes its value through the easy manner in which the reader is given a comprehensive yet concise description, covering not only the application of these principles to handling materials, machinery, money, and men, but also to the coordination of these factors in the major problems of getting out the product. In each chapter the reader finds a clear presentation of the main facts of the particular subject discussed, and supplemented by ample references of a standard nature that aid materially in a more intensive study of the principles.

Insofar as the author's effort is to present plainly to young engineers (especially those entering the industrial field) "the salient facts regarding the most important movements with which they are sure to be brought into contact, and to explain the origin and growth of the important features of industrial organization", he has succeeded admirably. The book is replete with suggestive information which can be utilized by the student or "apprentice" engineer as a means to that larger grasp of principles and that broader understanding of conditions encountered in industrial life, so essential to his success. It is obvious, in these times, that the more the young engineer knows about organization principles and business methods, the more valuable he will be to himself and to his associates.

It is to be regretted, however, that the author, in presenting these fundamental principles, did not lay more stress on the importance of executive ability in the correlation and coordination of these fundamentals in their practical or commercial application. So much of the true success in the development of the enterprise itself, as well as those who operate it, rests on a proper understanding of this vital factor, that it would not have been out of place in this work to have devoted a chapter to that subject. The true significance of facts, as brought out by adequate and accurate records, intelligently interpreted, determines the course to follow in achieving results, and no matter how versed the beginner may be in technical knowledge, it is the development of the right degree of executive ability that enables him to put the principles of modern industrial organization into action.

If the reader or student will recognize that his personal success in a managerial capacity thus depends on a carefully planned, and wisely executed course of action in accord with the general principles covered in this work, he may consider that the author has rendered him an invaluable service in the thoroughness of the text, and the book as presented should thus prove itself a reliable, dependable source of instruction and counsel throughout the user's period of contact with modern industrial problems.

RAY M. HUDSON,
Holt Manufacturing Co., Peoria, Ill.

THE NEED OF BETTER MANAGEMENT IN MINING OPERATIONS[1]

BY

HUGH ARCHBALD[2]

I WANT to speak of coal mining, because it is a proposition of large outputs and large numbers of men employed and the value of the mineral is less than in other kinds of mining. As a result the organization of the work underground has more relative importance.

ISOLATION OF MINING. The first thing which needs to be realized about mining is its isolation. A mine is not generally found in a settled community where many activities are taking place. Instead a mine is more often in a region where only mining is going on —at least in a region where it is the major activity. Mines are not crowded together with the proximity of factories in a city. A mine needs a large area.

RESULTS OF ISOLATION. This isolation makes it necessary for those who operate mines to provide houses and stores and water-works, in fact all that makes life possible. For workmen cannot be expected to build their own homes in a place where they are dependent for their livelihood upon holding a job with one company.

Those engaged in mining are living mostly on branch railroads and the life is not one of growth through contact with other activities. The isolation particularly affects the mine foreman who is responsible for the daily handling of the work of the mine, because his position isolates him in an isolated community.

WORK ADVANCING. Another thing to realize about the work in the mines is that the same operation is not repeated in the same place. The working faces of a mine are always advancing and conditions changing. The work of a miner is not repetitive as the work of a tender of a machine in a factory. Instead the mineral becomes mined out and the place abandoned.

DEFINITE LIFE TO A MINE. There is a definite life to a mine. In France several companies have been working for over a hundred years, but in that time several mines have been worked out and new ones opened.

GROWTH. A mine has a growth. Of a necessity it starts with only two openings—two roadways—and it takes time for roadways to be opened off other roadways before the output can be brought up to quantity. It grows as the roots of a vine grow from the seed. Its growth takes a longer time than the building of a factory, because the number of men who can work at any one time is limited. A large number of men cannot work at the face of a tunnel. To get a large output, one has to have a large number of tunnels, of working faces.

LARGE AREA. Headings or gangways—whatever the name used for the openings in the ground—are driven off of other headings and rooms are turned off these. All this requires area. And the area which has to be covered is one thing to be remembered when one comes to speaking about underground management. I have seen a mine with eighteen miles of trolley wires and thirty-six miles of track. Large areas mean long roadways. At another mine the working faces were between three and four miles from the drift-mouth at the surface. I went into a mine of only two hundred tons output the other day and the face of the main heading was 5600 feet from the drift. In that distance I could stand up straight only twice.

PROBLEM. Coal Mining is a problem of moving empty mine cars from the surface to the working faces where they are loaded by hand with the coal which has been mined; and then moving the loaded cars to the surface where they are emptied into railroad cars for shipment to the market. Moving cars and mining coal are the two operations which should be continuous.

The map of a mine which is just beginning, drawn on the scale of one hundred feet to the inch, the scale generally required by law, would cover hardly more paper than an ordinary letter-size sheet and would indicate working places for ten or twenty men. The map of a mine which has been putting out five hundred to a thousand tons a day for ten or fifteen years may cover a sheet of blue-print paper six feet by six feet. For five hundred tons output there may be three or four miles of main roadway in "live workings" and many more miles of "old workings" from which the track has been torn out. One man may be required to oversee work scattered on the edges of an area of four hundred or five hundred acres, a difficult thing to do on the surface of the earth in broad daylight and much harder to do in the tortuous openings of a mine and in absolute darkness.

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[1] Paper presented at the annual meeting of the Taylor Society, New York, December 6, 1919.

[2] Mining Engineer, Scranton, Pennsylvania.

SCIENTIFIC MANAGEMENT LACKING. In speaking about management underground I cannot give you descriptions of any of the elements of scientific management. They do not exist. At least I have never been able to find them and I have searched diligently. The industrial work which has been done in manufacturing along the routes of commerce has passed by isolated mining. In France I was asked, "What are you doing with Taylor management in the coal mines of America?" I answered, "No more than you."

MINING NEEDS INDUSTRIAL ENGINEER. That mining is in dire need of the industrial engineer is what I would like you to understand. For although he is not one who forgets the cost of an article yet he considers the welfare of the workman, the pocket-book welfare, not the charity welfare only—that of housing and playgrounds. It is essential for the workman that he have pocket-book welfare at each mine. For in coal mining if the workman changes from one company to another, he generally has to move his home, move to the next town. And so it is more difficult to change one's job. And with the uncertainty of earnings as they exist, it is disadvantageous for him to possess much goods. It is better for him to be free to move.

INDUSTRIAL WORK STANDS OUT. The work of the industrial engineer will stand out more prominently because of the isolation and because mining is not mixed in with other lines of work.

MINE FOREMAN FOCUS OF RESPONSIBILITY. The lines on any diagram of responsibility of management of a mine will center on the position of the mine foreman. For the mine laws license him to practice. Article IV, Section 1 of the mining laws of Pennsylvania reads: "In order to secure efficient management and proper ventilation of the mines, to promote the health and safety of the persons employed therein. . the operator . . . shall employ a competent and practical mine foreman." It further states that "The mine foreman shall have full charge of all the inside workings and of the persons employed therein."

LAW CONCERNED WITH SAFETY. Now I call your attention to one fact concerning the law. It gives as the first purpose that of securing efficient management, but all the provisions concern the safety of the men and good engineering practice. The rules are all excellent—for safety. But none of the provisions give a hint concerning the best way to coordinate divisions of labor. Nor do any of them contain a hint of any of the principles of management as understood by the industrial engineer. The questions on the examination papers for mine foremen's certificates all concern safety and engineering features. That there is a real art of management is not understood and is not a virtue required by law of the mine foreman.

KEYSTONE OF THE ORGANIZATION. The mine foreman is the keystone of the organization. The planning department he carries around under his hat; the supervision-of-work-in-progress department is in the same place; the inspection department is also under his hat. He has all the elements of the work to attend to.

UNDERPAID. He is not a highly paid man. In 1914 the highest paid foreman in the anthracite region received $165 a month. $125 a month was a customary pay. At that rate he might have been in charge of a mine worth a million dollars and the monthly payroll might have been between thirty-five and forty thousand dollars. At the present time one company is paying a base rate of $145 with $70 war allowance, a total of $215 a month. The pay in the bituminous fields is about the same. I was told the other day that in Utah the mine foremen are now getting $150 a month.

MINE LAW WRITTEN OUT. The mine laws are the only written instructions which the foreman generally has. You know what happens. He follows the law. That is very proper, but with the written instructions continually following him, his attention is mainly on what they prescribe, which is safety, and to the exclusion of any proper balance in the work. Safety is a large subject.

TOO MUCH TO DO. A mine foreman has more work to do than he can possibly cover. A mine is a growth. When it is small a foreman can cover all the working places. As a mine becomes large, he cannot. It took me sixteen hours to walk the route which one second assistant mine foreman was expected to cover every morning in four hours. At another mine, when it was measured up and the time calculated, it was found that the distance which the foreman was expected to cover was so great that he could spend only forty-five seconds with each workman if he was to make his rounds to every working place as the law requires.

INTERMITTENT WORKING. The intermittent working of coal mines has been much spoken of lately. It is a fact to reckon with, for the frequent idle times necessitate skeleton organizations in order to reduce overhead expense. When work comes the jump is from no production to full production. For the foreman with a large area to cover, it means that he must do his work in a rough and ready fashion, depending on the workman to find in some way their own work and take care of themselves. It is the perfecting of the manner in which a mine foreman does his work that has been most neglected.

TWO MAIN CLASSES OF WORKMEN. There are two main classes of workmen in coal mines, divided according to the manner in which they are paid, known as "company men," who are paid by the hour, and "miners" (or loaders) who are paid by the piece, mainly by the car of coal loaded. The company men are only twenty-seven per cent of the number employed (in bituminous mines) while the loaders are seventy-three per cent, roughly one quarter and three quarters.

PHILOSOPHY OF EMPLOYING NUMBERS. There are many false ideas regarding the conduct of underground work. One of the most prevalent is that output is directly in proportion to the number of men employed. This does work out when transportation is very simple, as it is at the start of a mine when only a few men are employed. But where transportation becomes divided into parts and large trackage systems exist, then it does not hold. Another false idea is that the evil of poor attendance of the men can be obviated for the company by putting more men at work than are needed for the output. At one place only seventy-five per cent of the men came out for work each day and so they frankly employed more men than they needed. No individualization of the men was done there, and the transportation was spread so thin that men were not getting mine cars and so were not earning, and that come and go which is always attendant upon poor organization of work was occurring there. At the end of the year they had thirty-seven per cent of the men with which they started. On one road in that mine the men changed over two and one half times in one two-weeks period.

AN INCIDENT. An incident happened several years ago; I was a mine foreman at the time. My superintendent came to the mine one morning, and having gone over the mine map with me to find out how many new places could be started, ordered me to put men to work in each possible place. He wanted more output from the mine. At the same time we were limited in the number of company men which we could employ. Now we knew that we were not getting all the output from the miners which we had had and that consequently, as we were not giving them the mine cars and as they were paid by the car, that they were not earning as much as they should. And yet here were our orders to confound our position, to try to stretch our already stretched transportation still further. The company would not suffer from it as much as the men in the mine, but the company would suffer.

NO MEASUREMENT OF NEEDS. The thing to note about this incident is that there was no measurement of our needs, no determination by any system of records of any coordination in our work, no analysis of work to determine what would happen if more men were put at work mining coal. There had been no time measurements of transportation. Nothing.

Larger outputs were expected simply from the employment of a larger number of men. The mine was sixty years old. You are experienced enough to know that such things do not happen.

PRACTICAL MAN. Those orders were issued by a man who had spent his whole life in the mines, starting, as he boasted, when he was nine years old. He was the embodiment of the *practical man*. You who have not been around the mines do not know how they harp on the subject of the practical man. Even the mine law requires that a practical man shall be employed as mine foreman. The college man is at a discount; even the man with a high school education. The mining law of Pennsylvania requires that a man should have five years experience in and around the mines before he can get a mine foreman's certificate. Five years work for a poorly paid job is not a thing to tempt a college man.

In coal mining the mining engineer is generally merely a surveyor. I was standing at the head of a shaft one day timing the operation of hoisting men out of the mine, when a miner asked me what job I had. I told him that I was an engineer. "Where is your transit?" he asked me scornfully, as much as to say I was not an engineer.

COAL A TRANSPORTATION PROBLEM. Coal mining is mainly a transportation problem underground. Large tonnages in small units have to be handled over a small railroad system involving a large amount of switching. The majority of the company men are employed on transportation. They have to handle the empty mine cars, delivering them to the miners to load. If transportation is not provided in proportion to the needs of the miners, then they will not get the cars and their earnings will be low. And if transportation is spread too thin, there will be a higher cost to the company.

Time to Load. A ton of coal can be easily loaded into a mine car in twenty minutes. The price paid for machine-mined coal in the bituminous mines is $.72 a ton. At this rate a man should earn between $8.00 and $9.00 a day. Twelve tons a day is not too hard work for an ordinary man accustomed to shoveling. It is a standard for amount in some regions. Recent statistics give the amount mined per man as an average of 4.6 tons per day. The accepted day rate is about $5.00. You will see that it takes about seven tons a day for a miner to earn what is the accepted rate and that instead of that amount being the average, it is 2.4 tons less.

Cost to Operators. The cost to the operators, because the men do not work up to their capacity, comes up at the times of argument concerning the increases of wages. Then increase must be granted. But no matter how much increase is granted, the pay of the men never comes up to the point that it should, because the opportunity to work is so small.

As all the operators are in the same boat and as blanket agreements are made with the men, the increased cost due to increased pay rates are passed on promptly to the consumer. And the companies do not suffer. Their basis of competition has not been changed.

Tabulations to Show Lack of Balance. In order to show the usual lack of balance and coordination in underground work, I will present tabulations of the work of two mines in transportation. In the first of these (Table I) in order to have a comparative basis for the work of motors and mules, cars-per-thousand-feet-of-haul has been used. The number of mine cars from any road varies and the distances over which they are moved are unequal but the unity of quantity over the unit of distance gives a means of measuring the equality in the amount of work performed. A fair day's work for a mule is 100-tons-1000-feet over a fairly level road, though cases have occurred where a mule did forty per cent more than this. The work of motors is not as simple as that of mules, as it is not often a direct haul between two points, but is confounded with switching. On this account a new standard has to be worked out at each mine (where the conditions under which the various motors are working are probably similar) according to the best performance of the motors.

TABLE I

Road	Mules	Drivers	Motors	Distance Cars in 1000 ft.	Cars	Cars per 1000 ft.		Man-Days	Cars Per Man-Days
A	1	1		1.250	288	361	383	184	1.56
B				0.100	220	22		60	3.67
C	1	1		0.550	249	137		183	1.36
D	1	1		1.250	240	300	376		
E				1.950	39	76		38.6	1.00
F	1	1		1.950	361	705		104	3.47
G	1	1		1.500	203		360	65	3.13
H				0.700	79			35	2.26
I			1	3.950	248		3425	175	1.42
J				2.750	654				
K				2.650	245				
L			1	2.700	362		1871	163	2.22
M	1	1		2.400	280			238	1.18
N	2	2		0.800					
				2.400	557			224	2.48
O	1		1	0.400	164	66	447	65	2.52
P				1.500	298				
					134			122	1.10
Q			1	4.200	160			62	2.58
R				3.000	9		2479	51	
S				2.200	320		79		
T				4.600	131				
V				4.00	118			49 85	2.41 1.18

First Tabulation. The period over which this tabulation was made, was for twelve days of work, one two-weeks period. And although it is not absolutely mathematically correct, it does give the relative amount of work done by the several units, which have no correspondence one with the other. For, considering the size of the mine car, a mule should have had about 400-cars-1000-feet, but this amount varies from 137 to 705, while the performance of the motors shows as great a discrepancy. Even averaging the last three motors, whose work was somewhat mixed up, as one motor was often taken to do another's work, the amount for the three would only average 1599 as against one motor's 3425. When time measurements were made on the motor doing 3425, it was found that this one was not working to its full capacity, but could have been used on other roads as well.

COMPARISON OF THE WORK OF MINERS. When comparison is made between the number of men employed—both miners and laborers—on any one road and the number of cars mined from that road, and the respective numbers on any similar road, as itemized in the last two columns of the tabulation, one finds here discrepancies also. For instance M road and O road can be compared as they were in the same seam and had similar mining conditions. So while M produced 1.18 cars per man per day, O road produced over twice as much or 2.52 cars per man per day. The rate of pay was about $1.00 for all the roads. It was a two-ton car.

TABLE II

HALF MONTH OF BITUMINOUS MINE

Road	Pay, Cents Per Ton	No. of Men	Cars	Haulage
B	5962	2	42	2½-ton motor
B2	42	3	42	
B3	5962	4	88	1 mule, 1 driver to sidetrack
"	42	7	138	
A1	5962	4	84	2½-ton motor
A2	72	5	187	
A3	72	10	230	1 mule, 1 driver
A4	72	2	66	2 mules, 1 driver
"	42	8	204	
A5	72	12	348	1 mule, 1 driver
A6	42	16	420	1 mule, 1 driver
A7	5962	4	104	1 mule, 1 driver
A8	5962	4	79	
Main A	42	2	66	

2½-ton motors, 84 and 271 cars.
1 driver. 88, 230, 270, 348, 420, and 249 cars.

RECAPITULATION

	Pay	No. Men	Cars	Cars Should Have Had	Difference
Cut and load	5962	18	534	576	—42
Machine	42	36	870	1440	—570
Pick	72	31	838	745	+93
			2242	2761	

SECOND TABULATION. The second tabulation (Table II) is from a bituminous mine. Here only one seam was being mined and the conditions on all roads were practically the same. You will notice that one motor did over three times as much as the other and that there is no equality in performance between the various drivers and their mules. The boy who got out 420 cars had to travel ten miles a day to do it. In the recapitulation you will see that the men who had the lowest rates of pay got the smallest number of cars—that is got less than their proportion. The output of the mine would have been 27 per cent greater if these men had been given cars; if the work of transportation had been pushed better. The output per man for calculating the number of cars they should have had, was only seven tons a day.

As a side light on this mine and the floating from one mine to another, which is blamed so bitterly upon the workmen in the mines, I should say that this mine had only nineteen per cent of the men that it had had a year before.

TIME ELEMENT. I do not need to call your attention to the need and uses of time measurements. You probably know more than I do on that subject. But you do not know how unappreciated in mining is the fact that the time element enters into all work. A mine is a friendly place. One can stop and have a chat with any one at any time. When you take up the matter of delays, you find the people about the mines so accustomed to them that they consider them unavoidable; such things as poor switching arrangements and bad frogs along the track and cars getting off the track. That is a part of mining to them. In measuring the work of a shaft, it was found that the engineer took ten seconds to respond to the signal to hoist. This repeated three hundred times a day meant a loss of fifty minutes a day and that loss of tonnage to the company and that loss of tonnage to the miners.

MINING SAME AS OTHER WORK. Although mining considers itself a thing apart and quite different from any other line of work, the principles laid down for manufacturing can be adapted to it. Curves indicating the progress of work can be easily used.

CURVES OF A SHAFT. As an example of such curves, some plotted from the work of one shaft are presented (Fig. 1). The data on which they are based are taken from the record kept by the hoisting engineer, who put down each hour the delays inside the mine and the delays outside and the number of cars hoisted. At the end of the month totals were made for each hour of the day and for the total working time. Percentages were then calculated for each hour, percentages being taken as one basis for the

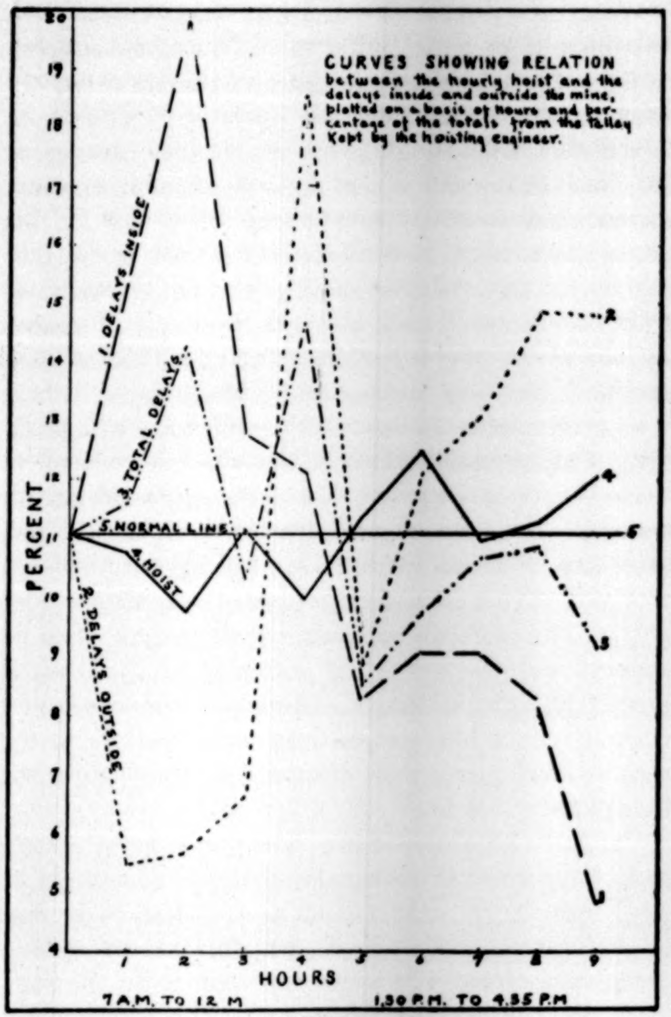

Fig. 1

curves in order to be able to compare different months. The other basis for plotting the curves is the hour of the working day.

Interpretation of Curves. The interpretation to be made from these particular curves is that the biggest percentage of the output was obtained in the second half of the day. For if the mine had been working at an even gait, 11.1 per cent of the output would have been hoisted each hour, whereas all the morning hours are below this line and the afternoon above. If delays had been eliminated, the capacity of the shaft would have been twenty per cent greater, although the record was made during the month of its greatest hoist.

The curve for the inside of the mine shows that the delays are greatest during the first two hours of the day. This was due to a slow start inside the mine. The curve for the outside, on the other hand, shows that delays are least in the morning hours (except for a peak at the fourth hour due to three breakdowns) and increase during the day, indicating that as the work inside increased, the outside became crowded. The curve for total delays has peaks opposite to the hoist and indicates that the mine did not get thoroughly going until the fourth hour.

Too Much Coal. The mine from which this curve is taken had one fault which is often found. So much emphasis is laid upon getting out coal, that often those in charge of work forget that coal cannot be obtained without empty cars. At this mine every mine car was loaded with coal at the beginning of the day; there were no empties for the miners—not until coal had been dumped and the mine cars transported to the working places could the miners begin to work. There was even a night shift so that it would be certain that every car was filled. Of course the day men got a slow start. And the mine got a slow start because the roadways were so filled with loaded cars—cars all traveling in the same direction—that the motors could not manipulate them. It was an unbalanced way of doing things.

Measurements Coarse. Measurement work can be done in mining. The units do not need to be refined. They can be crude and large. An Ingersoll will do as well as a stop watch, and the use of the Ingersoll is indefinitely better than the usual nothing.

Unrelated Incidents. As there is so little attention paid to organization of work underground, unrelated incidents will show up the manner of doing things.

No Mine Office. At one mine they would not let the mine foreman have an office underground for fear that he would sit down. A mine is a cold place; the average temperature is about 60 degrees F. It is also a damp place, and a mine foreman cannot always be in motion. He has to stand still when men are reporting and when he is giving orders about work.

Sergeant Who Had Been a Tracklayer. I was talking about the mines one wet night in France, with one of my sergeants who had been a tracklayer, and he remarked: "I used to get many a nine hours for a night shift and be out at quitting time with the day shift. We would be told to change a rail. So after lunch we would get the rail and put in the new ties and pull all the spikes except those at the end of the rail. The last trip would go out half an hour before quitting time. Then we would yank out the last couple of spikes and change the rail and spike it in place in a hurry and catch up with the day shift going home."

Mine Foreman Cannot Follow-up Details. You see a mine foreman cannot follow-up details of work sufficiently to know that men who are being paid for night work are doing the work during the day. Tracklayers are generally given a district to take care of and as long as it is kept in order, no one bothers them to know how they do their work.

CHECKING IN AND OUT FOR WORK. The mine law of Colorado, for instance, specifies that men shall be checked in and out of the mine. The law of Pennsylvania does not mention the subject. But imagine having to specify in the law that men should report for work. In many mines the men on piece rates—three quarters of the men employed—report neither morning nor evening. They come to work and go home just when they choose. Very few of them spend a full day in the mines, contrary to the accepted belief of people unacquainted with mining that a miner toils long hours underground. If you will notice the first accounts of an accident in the papers, you will see how long it takes before it is known how many men were in the mine when the accident occurred. And imagine directing work when you do not know how many are at work!

WHERE ARE YOU WORKING. The safety lamps which the miners use are provided by the companies. I was standing at a lamp shanty one afternoon to find out how many lamps were turned in to be cleaned after quitting time. There were a couple of hundred in use and only three were turned in after the whistle blew. All the rest of the miners had gone home ahead of the whistle. The last man out came along twenty minutes after quitting time and the lamp man was peevish at him and demanded, "Where do you think you are working—Pine Hill?" Pine Hill was three or four miles over the mountain.

LACK OF COMMUNICATION. There is no regulated system of giving orders to the workmen. Communication is generally so bad that if you wanted to find a boss to direct him to see that certain work is done, you have to wait till the next day before the work is started. You can find the man only at quitting time. After a boss once gets started on his rounds through the mines, it is mighty hard to overtake him. One result of this lack of being able to direct the right man to attend to a piece of work, is that every one as he passes the workmen issues orders and the workmen have many conflicting orders. A diagram of responsibility from the mine foreman down would show assistant mine foremen and driver bosses and other sub-bosses. Practically the mine foreman issues orders directly to the men as well as the others.

WORKMEN SUFFER MORE THAN COMPANIES. The workmen in the mines suffer more from the disorganization—the lack of balance and coordination—of the work of the mines than the operators. Companies lose money when equipment is not used to capacity or too much equipment is tied up in track and maintaining ventilation. They lose money when they do not get a full amount of work from the men whom they pay by the day. But in mining it is not the same as when a machine stands idle in a factory. If coal is not mined one day, it remains to be mined and sold on another. Coal is a raw material and in mining it there is no manipulation to increase the refinement of a product. Consequently there is not the compulsion to work the organization to the same pitch of smooth running. But the man paid through piece rates, if day after day he cannot work to his full capacity through no fault of his own, but because those whose duty it is to plan work do not plan it with balance, then he suffers; and the individual suffering of the men is greater than the collective suffering of the companies. That is why I have emphasized more the loss to the men in the mines than the loss of the companies, though they lose too.

CANNOT GET GOOD MEN. The president of a company complained the other day that you cannot get as good men for superintendents as you used to be able to get. Superintendents will complain that you cannot get good foremen. Foremen complain about the men.

COMPLAINT OF THE MEN. The complaint of the men is best illustrated by a conversation which I had with a miner. I was wandering through the mine in my dirty clothes and he thought that I was a miner from another room on the same road; a workman like himself. I had recently arrived at the mine to do some engineering. It was at noon and the men on that road were getting their first car for that day. They had been five hours sitting around in the cold, wet air of the mine waiting for work. I will quote from my notes. "Man working alone in No. 22 asked me, 'How much you make—two dollars?' I said, 'About that.' Then he said, 'This no good. Ninety cents a car. Then no cars; no timber; nothing. No can make living. Maybe make dollar 'n half. Maybe nothing. I don't know what's matter. No get nothing.' "

THE TROUBLE. The matter is that there is no coordination and balance in underground work and no measurement of work by which this balance could be maintained. No work such as is done by the industrial engineer.

DISCUSSION

MR. THOMAS T. READ[1]: Mr. Archibald has spoken on the need for better management of mining, but in the development of his subject has wisely restricted it to a more simple one, namely, the need for better management of coal mining. Mining in general is a subject of so diverse aspects that it would be extremely difficult to discuss the management of it in such a general way. Coal mining is a quite distinct subject and differs widely in many ways from any of the other kinds of mining. It is a large enough industry and has many characteristics that make it more nearly amenable to a discussion of this sort.

Coal mining alone is a big subject and there is not sufficient time available for discussing in any adequate way all the problems which enter into its management. To do so would take us into the fields of economics and sociology as well as engineering. I do not want any one to get the idea that it is ever going to be possible to standardize mining operations in the same way in which you talk of standardizing shop operations. The fundamental assumption of standardization is that you do exactly the same thing over and over and therefore find it worth while to put a good deal of effort into finding the best way to do it. In mining we do the same thing over and over in a broad general way, but the details of advancing the drift or cutting the stope differ and thus make standardization difficult. I can perhaps make my point clear by the statement that while it is impossible to put a razor edge on a hoe, that is not an adequate reason for not sharpening the hoe at all. It is impossible to standardize mining operations in the way which you can standardize shop operations, but nevertheless you can do a good deal to improve matters, and I want to say that a good deal is being done in many parts of the country.

Just to press home my point as to the uncertain nature of mining, I want to tell you of a recent incident where a well-known engineer drove a tunnel for several hundred feet into the mountain, following, as he thought, the orebody. The tunnel did not disclose ore that was sufficiently rich to be profitable and after a good deal of money had been spent work was abandoned. Immediately afterwards another company took over the work, another engineer drove the tunnel six feet to one side and found a large body of very rich ore. Where the basic conditions on which an enterprise are based are so uncertain as that, it is obvious that standardization is not likely to be regarded as important. In other words, when it is uncertain as to whether it is worth while to drill holes at all, it is not likely that a great deal of study will be devoted to drilling them in exactly the best way. I remember another friend of mine, who was in charge of a mining operation in the West for a number of years and finally gave it up and turned his efforts to something else. When asked about the enterprise he remarked, "What can you do with a copper mine that turns out to be a zinc mine?"

Another point must be kept in mind, namely, that a mine is a wasting asset. Every mine comes to an end sooner or later and many of them sooner than is expected. For that reason the management is not justified in going to the expense of standardizing operations as you would in a manufacturing plant, for example, where so far as you can forsee the business will not only continue indefinitely but is likely to increase in size from year to year. You will notice also that a mine has what you might call an elliptical orbit. Starting from a prospect hole, when there is the greatest doubt as to whether it is worth anything at all or not, it is developed to a point at which it is reasonably certain of very great value. With continued working the whole body is gradually taken out, and finally it comes back then to the point of beginning, with the certainty that it is of no longer any value now that the ore has been worked out. It never attains a static condition, with the result that standardization usually lags behind the amount that would be justified by the importance of the operation.

Turning to the other side of it, the larger mining operations have a degree of stability which justifies their management in devoting attention to the standardization of operations. I am glad to say that a good deal of value has already been accomplished. At one of the metal mines of Butte, the mine manager has greatly decreased his cost of working, through the application of better management to his mining operations. At another mine in the West a careful study of shoveling operations has met with extremely valuable results. Perhaps in this same class would come the increase in output and lowering of costs that have been made in the Wisconsin zinc districts, although this is largely a result of the adoption of a better system of wage payment.

I especially want to commend one thing which Mr. Archbald said; namely, that there is too little supervision in coal mining operations. My own observation has been that this is very commonly true of mining and metallurgical plants. We see its results in the accident records of plants, where too many men are under the supervision of a single foreman to permit really good supervision. I long ago became convinced that it was poor economy to attempt to save the wages of another foreman by allowing men to work under inadequate supervision.

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[1] United States Bureau of Mines, Washington, D. C.

I am extremely glad that Mr. Archbald's paper has been presented before your Society, for I think the mining industry needs your cooperation and I hope the day will come when such papers will be a common feature of mining engineering societies.

MR. WALTER POLAKOV[1]: I have had the pleasure of both reading and again hearing the very able presentation by Mr. Archbald. It describes a typical condition of mismanagement of our coal industry. I don't think, however, that coal mining is very much worse, so far as management is concerned, than most other industries; but the particular importance of this bad mismanagement in this instance is due to the fact that the coal is the foundation of all our industries; in fact, of our entire so-called civilized life. Without coal we cannot live; without coal we cannot live even a very few hours in the mode of living we are accustomed to.

Of course, a natural question for me to ask is, not whether the Taylor system or any other system of scientific management will do any good—that is obvious—but whether there is any chance under the existing mode of ownership of the mines to introduce such. That is, whether the betterment of conditions and the elimination of losses is desirable from the viewpoint of the owners of the mines. This, I believe, is the most important question we should put before ourselves.

The question is, whether it is profitable to the mine owners to operate mines economically or not, and the answer to this question seems to be perfectly obvious. There is no need of making any kind of studies to support this conclusion by any new facts or statistics. If it were profitable to eliminate wastes, the conditions would be different. They are not different because it is not profitable to some coal operators to operate their mines more economically. So long as the industry is not carried on with the viewpoint of delivering the goods and benefiting society, the things are going the way Mr. Archbald told us. In other words, it is more profitable to the coal operators to leave the things alone as they are and make the community pay for waste and mismanagement. It sounds like an absurd statement but let us consider whether it is so or not.

One ton of coal that is mined today is being sold in the raw state. It is not manufactured. It is about the same thing as if we should eat wheat as we get it from the field. We just get the coal out of the mine and we burn it—such barbarous, such a ridiculous way of destruction of our national resources is incredible and unpardonable!

Coal can produce—and does produce if it is subject to certain manufacturing processes—I will call it destructive distallation—several by-products which are probably the chief products, such as ammonia sulphate, a very essential factor in fertilizing, benzol, which is fuel perfectly adapted for the internal combustion engines, tar, for various chemical purposes, coke, for steel-making as fuel, etc. We don't do that. Here the cumulative value—I mean by that social value, the benefit that society can derive from this product—is enormous. I haven't got with me the data I sent to the Hon. Secretary Lane on the subject, but I see here a gentleman who has given a great deal of study to this subject and he probably will be called to give more detail on the subject—Mr. Scott. I have asked him to give you figures I have prepared from the researches of the Smithsonian Institute on this point.

The wanton destruction of coal in the crude state does not stop at the mines, either. It goes further. When it is used, let us say on the railroads, it is used with only something like five per cent efficiency. Out of one hundred pounds of coal we burn on the locomotive we get only five per cent useful work, and of course all of these losses are not preventable so long as we have such an imperfect mechanism as steam locomotives. But at least one-third of the amount of coal that is used today on the railroads and in central stations and in private power plants can and actually is saved without exception in every case where the manufacturer feels that it is profitable for him to do so. But there is again the same vicious circle. It is not profitable to the manufacturer to conserve the foundation of our life and prosperity so long as he can get profit in another way. "What is the use," one of the manufacturers of Bridgeport told me, "What is the use for me to save thirty per cent of my coal bill when by an advance of one-half a cent per pound of my product I will get at the end of the year twelve times as much without any labor whatever?"

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[1] Consulting Engineer, New York.

Therefore, the future of our society is sacrificed to the immediate profit of those who have control of the things, but who have no social responsibility.

Coming a little closer to the subject, that is, of operating the mines, not in such slip-shod, shocking ways as described by Mr. Archbald, but with a little bit better care for both workman in the industry and the people of the country at large, I fully agree with Mr. Archbald that such things as stop watch and unit time study would appear in the beginning as a needless refinement. The point that strikes me in this case was brought home by the fact that today the miners are on strike and neither the Government by injunction nor any other force that has been brought to bear has forced them to go back into mismanaged mines. There must be something back of it. Somebody is agitating them. There is something that keeps the men out of work. What is that sinister influence which cripples our industry and endangers our life and prosperity?

The answer is clear. It was given by Mr. Archbald. The industry is mismanaged to such an extent that the workmen cannot afford to go back. Therefore, this sinister influence is Mr. Coal Operator himself.

MR. HOWARD SCOTT: The question of coal, the same as any other product, goes back to its origin and uses. Taking the Government statistics there are 762,000 miners engaged in mining in our coal fields. Their average is 794 tons. It does not matter much about the wages. That is a pressing immediate condition. The others speakers have stated that. This is something different. Out of the total amount of bituminous coal mined in 1918, practically 500,000,000 tons were used in the production of power—that is, in steam and such power. The average value of that coal at the mine mouth was $1.32 a ton, according to Government bulletins. That is $650,000,000; you can add it up for yourselves. The multiple product value of that same amount of coal is over $9,000,000,000. That is a waste of $8,500,000,000. Not very much! It only represents one third of the total capitalized cost of all manufacturing plants in the United States. Think it over.

You still have another way of looking at it, that is of evaluating these figures into something which you use. There are over 5,000,000 tons of ammonium sulphate blown off into the open air. These are equivalent, at 115 pounds of nitrogen to the acre, to approximately 500,000,000 additional bushels of wheat with the same acreage and the same amount of labor that we expended in raising wheat last year. Then 1,000,000,000 gallons of benzol—you can figure its value (and its truck haulage I won't waste time going into) nor the 4,000,000,000 gallons of tar, of which you all know the uses and the current value.

But someone says "Why can we not use this?" You have a very simple answer. One third of the freight carried on all common carriers in the United States is bulk coal. Seven hundred thousand security holders of United States railroads have an average holding of thirteen thousand apiece, a total of nine billion one hundred millions of railroad securities, and banks and insurance companies hold three billion five hundred and six million. This gives you a total of twelve billion six hundred and six million held by .63 of one per cent of the population of the United States. Seven hundred thousand people, or .63 of one per cent, are not going to eliminate one third of the dividend earning capacity on that twelve billion dollars by instituting any social saving to the country at large.

There are over ten railroads in the United States that would practically go out of business. These are roads east of the Mississippi. Take the Kanawha River and the Kanawah-Michigan Railroad. During 1916 there were one million and some odd hundred thousand tons of coal carried on the Kanawha River, while the Kanawah-Michigan Railroad, which parallels it for a considerable distance, carried over three times that amount, and as coal men know, your river mines are operated much more intermittently than your railroad mines, because of high water and so on. The preference is given to forms of transportation which are at present in vogue, which are obtaining profits, and will continue to do so. There is no remedy for this situation other than a complete coordination of all industry, because you have to go back to the origin of a material, and the method of its production, and its relativity; these, as I have shown, effecting another tremendous basic industry in this country, which apparently we are leaving out of the coal problem.

I omitted one thing. In the use of coal by this technical method you would obtain over one hundred per cent greater power. This means that if coal were used scientifically over five hundred thousand men that are now mining it would no longer be required. This brings another consideration. You cannot, today, put those five hundred thousand men at anything else. You have not the control of the situation which allows that to be done. Therefore the United Mine Workers, or any other mine workers, are going to mine coal because they cannot work at anything else.

You have not even sufficient control to remedy the technical situation in the use of coal. You are faced with the question of "why" and "how," or in other words, a change in the technique of administration.

POSTSCRIPT

MR. ARCHBALD: Two things have happened since the first part of December; two things which will have a bearing on the lives of those who work in the mines. One of these is the commission of three, called by the President to investigate and make awards concerning the recent demands of the United Mine Workers. The other is the inspirational appeal which Mr. Herbert Hoover, newly elected president of the American Institute of Mining and Metallurgical Engineers, made to the members of that society, that they apply themselves to the industrial problems of coal mining and that, as engineers, they take a part in civic life.

Concerning the first happening it is too early to report, as the Commission itself has made no report. Concerning the second happening a discussion is possible, because Mr. Hoover's appeal was made at the beginning of a two-day session of the Institute and was followed by a number of papers presented by well-known men.

They were very estimable papers. The titles were "The Fluctuations In Coal—Their Extent and Causes;" "Storage of Bituminous Coal and Its Possibilities of Stabilization;" "Transportation as a Factor in Irregularity of Coal Mine Operation;" "Stabilizing the Market;" "Conservation." But some way, after it was all over, one was reminded of the favorite expression of the old Welsh mine foreman; "Leave it as was it." They presented figures about millions of tons of coal used in this or that way. They acknowledged the intermittency with which mines are worked. They had to acknowledge that, because a fraction of one per cent of our population had put up a hearty kick over it and had thrown a scare into all industry. And the intermittency was shown to be poor business and was due to this and that. The blame for conditions was put in many places by the various authors, but was never taken home. The public was blamed because it would not buy coal in the summer though they paid a higher price in the end. The railroads were blamed, and exonerated in the next breath because operators were to be blamed. And then operators were exonerated because the public was to blame. There was much talk of the possible use of machinery, with the implication that machinery could cure social, human ills.

To one listening in for two days, it seemed as if the discussion went around like a puppy chasing his own tail. One cannot break down in one session a long continued policy, and social subjects have been taboo in the Institute of Mining Engineers. So the members of the Institute talked business and machinery. The things suggested will have their effect on the lives of those working underground, but it will take ten to twenty years to accomplish them. No one cut through to that heart of industrial questions, which should be answered before quitting time; "How is Mike Kowalowski going to earn enough money to maintain his family in decency?"

No young man, fresh from contact with the work of a mine and interested in life, was heard talking. It was a session of older men. There is still hope, however, that some ray of sunshine may break through to those who are now working in the mines. The President's Coal Commission is up against the immediate problem. And Mr. Hoover's appeal may reach through to the young men of the Institute of Mining Engineers; and perhaps in the future—perhaps at the next meeting—?

ALBERT R. SHIPLEY

Industrial Engineering Department, Winchester Repeating Arms Co.

DIED FEBRUARY 15, 1920

Whether in contact with workers or with executives, his personality won him friendships and his command of the technique of scientific management won him professional respect. Called to Watertown Arsenal at the outbreak of war, he there gave himself so generously as to impair a constitution which was none too strong for the task. He, too, died in the service of his country.

THE PRESIDENT'S INDUSTRIAL CONFERENCE OF OCTOBER, 1919[1]

BY

HENRY S. DENNISON[2] AND IDA TARBELL[3]

I.

HENRY S. DENNISON

I AM going to speak a better word for the Industrial Conference than I imagine most of you have in your minds, although its failure was conspicuous. Its chances of success were, nevertheless, very real. They were chances which did not materialize; but in business affairs, as in many of the ordinary affairs of life, we are well used to chances that don't materialize. In order to accomplish anything at all, we must continue to take chances.

I speak specifically, for example, in regard to the practice of group voting. This caused considerable discussion, and in the minds of one or two especially in the Public Group, became a question which was virtually an obsession.

Now the group voting, if the conference had succeeded, offered a very important opportunity; an opportunity for a group officially representing the employers of the country to make a statement of their position which might be so progressive as to help materially in leading us on into better industrial days. And group voting offered a similar opportunity for labor, an especially conservative body of labor, to make an expression of progressive opinion.

If there had been no group formation we should have had simply an aggregate of individual opinions. So, although group voting created difficulties, it also gave an opportunity for considerably more effective service than would have otherwise been possible.

Naturally to the second conference there had to be called a group of men viewing the situation more or less from the outside, and their opinions must be considered more as academic opinions. I hope and have faith that they will so back their opinions with the opinions of both employers and labor that they will come to have the weight of opinions of parties to the controversy.

The primary handicap that we staggered under was the existence of the steel strike. I say "existence of the steel strike" because it is probable that with the steel strike in existence it was actually impossible for labor to keep the question out of the conference. They had to bring it in, and as soon as it was brought in it was perfectly clear that our mission held a sort of family resemblance to Henry Ford's mission on the peace ship; in the midst of a bitter, raging conflict we were asked to express opinions as to what should be done in the future after the conflict was all over. That, of course, made our whole problem difficult because there was too much reference to that conflict in mind —certainly in the minds of all of the Employers' Group and of the Labor Group—and it was difficult to make a statement of principle that we felt might apply in the future without its undue reference to this specific conflict.

That the steel strike resolution was brought onto the floor was the final step in the dissolution. It was next to impossible to keep the conference on its job after that. The members of the Public Group took the one opportunity they saw of postponing consideration of the steel strike resolution until we should take up some other subject. Individually, I don't think we cared much what that subject was, as long as it was one which would postpone consideration of the steel strike and possibly give opportunity to cool off.

The breaks didn't come our way. One circumstance which has not been given much attention, but which appeared to me at the time and since as of considerable influence, was the illness of Mr. Gompers. He never came back from that illness in full strength, and, consequently, didn't have afterwards the vigorous tactical power that is probably his; and it is more than imaginable that he might have saved the situation by holding labor there in spite of the tremendous pressure that was brought to bear upon them by the telegrams from all over the country, if he had retained his full strength.

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[1] Addresses at the annual meeting of the Taylor Society, Saturday evening, Dec. 6, 1919.

[2] Dennison Manufacturing Co., Framingham, Mass., Member of the Conference. President of the Taylor Society.

[3] Investigator and author, New York City, Member of the Conference.

The make up of the Employers' Group also had something to do with the case, and in a direction which should interest definitely the Taylor Society, because, as a matter of fact, the Employers' Group much more thoroughly represented capital than it represented management. There was the training in the financial office; there was the training in the corporation lawyer's office; there was much too little of the training that comes from direct contact with the employees, direct contact with the production problem.

A most amusing episode was when one of the Employers' Group in answer to Labor's claim arose and said: "Labor says that they want to have the right to hire outsiders, attorneys, to represent them because we employers hire a lawyer if we want someone to represent us in labor difficulties. Gentlemen, we never hire a lawyer in our business. As soon as a corporation lawyer gets into the game it is all off." The leader of the Employers' Group was a corporation lawyer!

And their difficulty, as a matter of fact, was the legalistic attitude. The wording of resolutions was subjected to a scrutiny which harried my soul. I was afraid that I must go back over some familiar phrases in the decalogue and read them again. They might contain hidden meanings that I hadn't suspected. It is the natural lawyer state of mind. It was as if each resolution was a contract which had to be drawn up in such terms that it couldn't possibly be misrepresented, and, consequently, must be full of "whereas" and "theirs" and "assigns" and such things that ordinary employers don't understand.

That attitude in the Employers' Group was unfortunate, and it was also unfortunate that although they had gone a considerable distance in their debates during the summer and had made a preliminary statement, which was very hopeful and of a somewhat advanced stand, they had done all their advancing before they came into the conference; and, tactically, it is next door to impossible to get two sides together if one of the sides has absolutely nothing to yield. There was in the trading, as a matter of fact, the beginning of a somewhat yielding attitude shown by Labor, which stiffened day after day as it became manifest that the Employers' Group had compromised, before they came in, as far as they intended to.

Again, I want to revert to the make up of the Employers' Group because, as I say, that is a point of great importance to the Taylor Society. If we are to get ahead and handle the industrial relations problem better and better each year, it must be done on the job. It must be done by a management resident in the business. It cannot be done by absentee directors; it cannot be done by the distant financial management which is all too common in American corporations.

Let me read one paragraph from a recent pamphlet sent out by Mr. Hood, of the Hood Rubber Company. Mr. Hood was a prominent member of the Industrial Conference, although he was not in the Employers' Group. He was closely in touch with them and therefore looks at this question certainly not from any Bolshevistic point of view.

He says: "I estimate that eighty per cent of the cases that came before the National War Board came from those concerns where the general management was not at the place of operation." That is absence management.

Turning for a moment to the Labor Group; in spite of the fact that their voting was apparently quite unanimous, the differences in opinion were real. There was really a wide and interesting range of opinion, a range which in itself is hopeful, more hopeful than the official actions would indicate.

The split came on the question of collective bargaining, not because of any difference in acknowledgement of the general principle, but on account of distinct differences in related principles, and because of differences so vital in the application of the general principle of collective bargaining that they really amounted to difference in principle.

The Employers' Group stood very firmly against the necessity for any employer to meet with a representative of his workmen if that representative was not in his own employ. The employers might meet with such a man if they chose, but reserved the right of refusal to deal with an outside labor representative. They were perfectly rigid on that point, and as I shall say later, to my own way of thinking, were mistaken.

Labor's special point was not so rigid, but was a point which they pressed with vigor, although they couldn't press it as a general principle. It was that the Federation principle, the trades union principle, was the one principle of organization for employees which should be encouraged. They were attempting to sell the Federation, anxious to sell it as the only right form of organization, and anxious that nothing should be said that encouraged shop unions. I put it that way because they could not and specifically did not stand against the works committees or shop unions as a principle. They simply said that they would be misused by employers and that there was no hope for the labor movement in any such form of organization; that the hope lay in their own form, the trades union.

That is natural enough, and they gave by their attitude a chance to get ahead in the early stages of the conference. We had several fair breaks which we thought were going to bring both sides together. But, as I say, as the employers showed more and more that they were pretty rigid and had already formed their opinions and were not inclined to yield, labor likewise stiffened up.

It may be of importance or at least of interest to the Society to know what my own point of view was. My own chief interest there took the form of a few resolutions. One of the first was upon the essential necessity of efficiency in management as a basis for any bettering of industrial relations. I shall not dwell upon these, unless perhaps the resolution on collective bargaining, which I will take up more in detail because I have collectively bargained with Miss Tarbell to do so, and she may want some of the others and I shall not tread upon her territory.

That resolution upon efficiency I am sure this Society must agree to. I put in another resolution upon the importance of the development of workers' committees, plant committees, for the purpose of facilitating consultation with employees, of getting at their interest, of enabling them to express their instincts for workmanship, of giving them a chance to develop their self-respect, to develop slowly the limited partnership which must probably be the outcome of improvement in industrial relations.

I put in an entirely Dennisonian resolution upon the control of corporations, milder than I should have liked, simply recommending that directors who knew something about the business be elected as fast as possible. That, of course, I seriously believe to be one of the most fundamental and most important of our problems; because it is honestly difficult for me to see how we can get very far ahead, either in a growing partnership with employees in this working out of our industrial production problems, or the development of the scientific attitude, if the last word lies with a group of men who have never visited the factory. As is the character of the directors, so will in the long run be the character of the management; and I believe that corporations will learn this lesson through the painful process, perhaps, of trial and error, the process of "survival of the fittest." But it will be much more hopeful for the country if we can learn it from reason rather than from brute force.

Another resolution on unemployment and its resulting economic difficulties will obviously appeal to the Society because of the recent work started by its Research Committee. And, finally, the resolution upon collective bargaining. I shall take the remaining minutes to develop the exact reasons, so far as I have been able to analyze them, for collective bargaining, and I don't need to suggest to this Society that it is a very wholesome mental exercise to find out exactly why we do believe or do not believe in this or that industrial policy.

In going somewhat rapidly over this analysis of the situation, I want to guard you against basing any conclusions upon the present situation. The present situation of supply and demand, is, at least we hope, unusual, and we must somehow or other transport our minds into more normal times before we can enter upon any sort of economic analysis.

I say, then, that as we are constituted economically, the value of goods, the value of services of all sorts, is set by the effective aggregate opinion of people as to just what that value is with relation to the value of other things. When we can get a true aggregate opinion, that is, all the partial opinions, all the opinions of various groups, articulated, and where there is no artificial restriction, such as monopoly of any sort represents, then price, the result of supply and demand, and that value will reasonably well coincide. Where those two do not coincide, where the true value, as would be represented if we could get an effective aggregate opinion, is different from the price in whichever direction, then there are a set of stresses and strains set up which are bound to lead to difficulty. Examples of such artificial influences were the prices that had to be fixed during the war, which those of us who were anywhere near them in Washington could see raised trouble and threw all sorts of things out of joint; but, of course, they had to be set just the same. Where you have the artificial restriction that comes through very close labor unions, where they exercise monopoly functions, and, on the other hand, where you get the undue weight of the employer as an organized powerful whole against the individual laborer, there also you find the upsetting influences which make the price and the true value two different figures.

As I conceive it, one of the jobs of social engineering is to remove such imperfections in our social machine whenever it is at all possible; or at least to attempt to so remove them. In law, of course, we have recognized the evils of monopoly and attempted in somewhat crude ways to cancel and nullify those evil influences. But we face a very persistent, a very real, a very active difficulty arising out of the inequality of bargaining power of the employer and the individual employee.

I say it is important. It is especially important because the sense of injustice is brought to light every week in the payroll. To the laborer it is especially important because as a usual thing a laborer is close to the margin of subsistence, and small differences mean more to him than similar margins in the price of cotton or paper would to the employer.

It is, therefore, fundamentally important that by all possible means inequality of bargaining power be remedied, or be nullified so far as possible. Of course they can be nullified, you will see, by wisdom on the part of the employer. That can be done in individual cases, but it is not to be reasonably and sensibly expected from the whole body of human beings who are and will become employers. We have little in the past to teach us that there will be breadth and generosity of attitude displayed on the part of any considerable group of men with the power in their hands which the present situation represents.

The inequality, of course, resides practically in this fact; that in bargaining with an individual workman, say in a factory of 1,000, the workman is exposing his whole stake on the bargain while the employer has at stake one-thousandth of his interest in that particular subject. As a practical matter, of course, we all recognize our power with the individual employee, although, of course, we do not always exercise it.

So it seems as if the only permanent remedy is the organizing of the workmen into collective units of one sort or another, so that with the whole group bargaining together with the employer, there would be represented on both sides an equal stake. The employer stands to lose all of his employees, just as each one of the employees stands to lose all of his job.

There are the two ways to organize employees, through the trade formation and through the shop formation. Without going too deeply into the reasons therefor, let me express my own view; that both of those forms will prove to be essential to sound social structure.

On the one hand, the shop union will offer for the individual plant the greatest advantages for cooperation, for getting ahead, for improvement, for the development of good relations; but it will have the fundamental weakness, if left alone, that the workers will be too much within the power of the employer. It will be, as a matter of fact, too easy under stress of national and international competition, almost to do away with the organization of workmen if the shop union is all that there is.

The trades union offers a defense of the workmen's interest which the shop union has not. But it loses almost entirely, I think, that opportunity for cooperation, that opportunity to develop good will and effective partnership which the shop union has.

There are instances of trade unions working closely with employers, and undoubtedly there is a promise that there can be closer working than there has been in the past. But there are not cases in sufficient number to warrant our judging by past results. We must judge by such reason as we can apply to the subject, and it seems clear to me that the workers cannot expect sufficient strength from shop unions, nor can we expect sufficient cooperation from trade unions. Undoubtedly we shall have both those forms, as they are the warp and woof of the labor structure.

So I took as the point of view—I don't know whether it is a middle course, but certainly it asked something from each side which it was apparently unwilling to give—that there should be the two alternative channels of mutual dealing—the trades union and the shop union.

There is much to say for the existence of alternative channels of dealing. The likelihood of any one channel turning too much in favor of one party or the other is very much overcome by the possibility of turning to the other channel. Each of those forms of unionism will serve, to my way of thinking, as a valuable check upon the other.

I want to say a word about the necessity that I believe rests upon employers of receiving, of making an honest attempt to deal with, any sort of representative that any group of their employees wishes to choose; and I am perfectly sensible of the employers' point of view, that dealing with a man from a national labor union may frequently be dealing with a man who has not the interests of his employees at heart, but has simply the interests of the national union; and the two may not coincide at any given moment; also, that he may be dealing with gentlemen of a red complexion, or with men of no knowledge of his particular conditions.

Nevertheless, if we as employers put any limitations whatever upon the right of the employee's choice of representative, he has not a free choice. And if we are to have collective bargaining, it is absolutely essential that there must be a free choice. If they choose to hang themselves by choosing any sort of a representative, red or pink or striped, that is the freedom that they must have in order to work out their salvation.

And as a matter of fact, this choosing of representatives, wherever unions have gradually developed constructive dealings with employers, has been done reasonably wisely; the roughest choices are made only where the bitterest fighting exists.

So my own point of view in the statement which I made, was that I felt that in the interest of the best development of industrial relations employers have absolutely no right to refuse to deal with any representative which their employees or any fraction thereof might choose. The dealings might be short, many times would be unsuccessful. But the employer has no right to prejudge the man who has come to represent his employees.

Practically no chance whatever was given to do any constructive work at the conference. We had a committee, of which I was a member, which had just one hour of work. Three men from each of the groups were members of the committee; but in that hour we came to an agreement absolutely unanimous upon a not unimportant matter, and the spirit of working together in those smaller committees was delightful and very hopeful. And if by any conceivable tactics we could have stalled and staved off that fighting question, the steel strike, so that some of the committees could have gotten to work and spent a few days together, I am convinced that we should have gotten together. We should have had many points of difference, many points upon which there would be three different resolutions; but I believe that, nevertheless, there would have been some important details of the industrial problem which we could have virtually agreed upon and sent out as an acknowledged step which must be taken.

The present conference may or may not be found to have what will be considered success. It is to my mind essential that it should be called, and it is not unlikely that it will make a contribution to the subject. When it is over and the subject has had a decent time to rest, whether it be successful or otherwise, I should suggest calling another. The depth of ignorance, the depth of misunderstanding on the subject, is such as to warrant a dozen more conferences to start us going on a road which we know we must travel but which, unfortunately, we know too little how to travel.

I hope conferences will go on, and, of course, I more deeply yet hope that this Society by the work of its individual members, by the work of its meetings and its committees, will make its peculiar contribution; because after all, notwithstanding the importance of collective bargaining and all the rest, I do place the greatest emphasis upon efficient management.

Without efficient management any system of industrial relations will go wrong, be it shop committees or profit-sharing, or anything else you might mention. With efficient management—there are already conspicuous examples of success in industrial relations in plants which have no conspicuous system for dealing with employees.

It is fundamental and essential that the work to which this Society devotes itself should be carried along to the very utmost of our strength.

II.

IDA TARBELL

How we went to pieces at the Industrial Conference on the principle of collective bargaining has been explained by Mr. Dennison.

We were sent there, as I think you know, to deal with the future. The President's call was specific. He asked us—and here I am quoting from his call—"to try to find some common ground of agreement and action with regard to the future conduct of industry." The conference was asked to concern itself not with the old but with the new phases of industrial organization.

Because of the comparatively few moments the conference was allowed to deal with the future some of the things which were in the minds of the members did not come out. They did not get to the public clearly and I think the public at the end felt that the members of the Industrial Conference had no ideas for a plan for the future conduct of industry. It is not quite fair that the conference should go entirely out of mind without examining this point, and I have made a rough sketch of some of the things which did come out and which might have been used if we had had the opportunity.

You know how we functioned. We were made up of three groups. The procedure was this: Each individual had the right to present any resolution that he wanted to get before the conference to his group. If the group thought it relevant, it could go to the floor of the conference, and be passed from the floor to the general committee and then assigned to a subcommittee.

The group in passing the resolution did not by any means commit itself to the idea. It simply said, "this thing is relevant and may go before the conference." In the little time we had for getting our ideas out, a considerable amount of material was presented and was read and turned back to the general committee.

The Labor Group presented its plans in a series of what Mr. Gompers called "propositions." The Employers' Group presented its ideas in a series of what it called "statements of principles." The method followed in calling these two groups made it possible for them to have programs ready at the opening of the conference. That was not so in the case of the Public Group. Most of the members of the Public Group had ideas, many had several ideas, and some of us had time to get our ideas before the conference and some of us did not.

The result was that there was a very heterogeneous batch of resolutions from the Public Group, and it is these that I have fitted into the programs of labor and employer to see if the makings of a plan for this future conduct of industry were in this first Industrial Conference.

An idea that developed at once was that we should have some classification of the things that were to come before us, some classification of terms and considerable definition.

The conference did make a start at getting this. Mr. Paul Feiss, of Cleveland, put in a resolution in which he asked that for the purposes of the conference the classification of parties involved in the consideration of the problem before the conference be as follows: "Union labor, government employees, public utility employees, plant unions, general unorganized labor, capitalists, management, government, farmers, general public." You see, that was an attempt to get the factors that we were to deal with there.

The Employer Group in putting out its statement of principles made a little attempt at definition. It had a rather interesting definition, I thought, of industrial organization. "Industrial organization is the product of an agency or an association of management, capital and labor, voluntarily established for economic production through cooperative effort. It is the function of management to coordinate and direct capital and labor for the joint benefit of all parties concerned, and the interest of the consumer and of the community. No employment relation can be satisfactory or fulfill its functions for the common good which does not encourage and require management and men to recognize a joint as well as an individual obligation to improve and increase the quantity and quality of production to as great an extent as possible consistent with the health and well-being of the workers."

In discussing the factors in industry, it was interesting to see that management had small attention. In the propositions that were put in by labor there was no mention of management. Labor and capital were the only two factors in industry so far as one could tell from anything that they put in. The Employers' Group did recognize management in the paragraph which I have already read.

Mr. Dennison was the only advocate for management that had appeared when the conference broke up. Two of his resolutions I have here, and while he was modest in his talk and ran over them lightly, I think that you would be glad to have the exact wording of this one, for instance: "Resolved that a substantial number of the members of the governing bodies of corporations should be chosen from among the managerial forces, the legitimate interests of all stockholders being duly safeguarded by appropriate contracts."

Another resolution Mr. Dennison put in was interesting. "Resolved, that managers and employees of each industrial concern should work together to provide, study the development and installation of improved industrial methods, including methods for the increase of producing efficiency; for the reduction of the wear and tear of the work on the body and mind of the workers; for increasing the interest of the work and its power to satisfy the desire of the worker for worthwhile accomplishment; for improving the working environment; for the more intelligent placement and education of workers; for the better adjustment of the work to the man; for the reduction of managerial friction and violation of the self-respect of the worker; and for the better selection and training of foremen and superintendents on the basis of their ability to lead rather than to drive their workers."

You see, we had something there that we could have worked on for some time. It was the intention of more than one in the Public Group, if we did get to work, to ask some of you gentlemen to come in and to help us at particular points. You can imagine how much help it would have been to the conference if we could have called in Mr. Archbald, for instance, to tell us some of the things that he told us this afternoon in regard to the conduct of coal mining.

A good deal of attention was given in the various resolutions to those matters with which collective bargaining chiefly concerned itself—wages, hours and the condition of labor.

Take the matter of wages. The "propositions" offered by labor and the "statement of principles" that the employers put in, both recognized the right to a living wage, that is, a wage sufficient to maintain the workman and his family. Labor defined this living wage as one "that would insure that the worker and his family should live in health and comfort according to the standards of American life." The employers' Group recommended a standard of living "that would be satisfactory to a *right-minded* man in view of the prevailing cost of living." Of course, knowing the Employers' Group, we were bound to have a good deal of fun over that right-minded man. It was one of my regrets after the dissolution of the conference not to have had that come to discussion. You may be sure he would not have been the kind of man that the Labor Group would have considered "right-minded."

Both Labor and the Employers' Group agreed to the principle of equal pay for equal work in the case of women. A set of resolutions covering women's work founded on the standards advanced by the Women's Bureau of the United States Department of Labor, defined this basis for determining her wage as occupation, not sex, and declared that the woman's wage should cover the case of dependents as it does in men, and not the individual.

An interesting contribution to the wage question was made by Mr. Russell in this resolution: "That the opinion of the conference is that the basic principle of wages should be this: that they should first be equitable under existing conditions, and then, without imposing any necessity or occasion for strikes to obtain that end, that they should automatically, on the foundation of an agreed-upon index number of prices, follow changes in the cost of living; and in determining what is an equitable wage there should be taken into consideration the profits of the industry concerned and the requirements scientifically ascertained for normal and wholesome living, with a reasonable margin to be added for comfort, culture and refinement."

The Labor Group in its demands did not look beyond the daily wage. The Employers' Group did look beyond the daily wage. In its proposition regarding wages it declared that they should recognize the quality and quantity of the worker's product, the value and length of his service, and they should reflect a participation in the enterprise to which he was devoting his energy.

Here, of course, was pregnant matter for discussion. It would have carried us into profit-sharing and the consideration of its various forms. We were bound to give a good deal of time to profit-sharing, although only one resolution on the subject came before the body, presented by Mr. Brookings.

Mr. Brookings' resolution was a combination. It looked not only to profit-sharing but to a participation in management, and to the encouragement of thrift.

Hours were considered in the program of both labor and employer, and in the resolutions concerning women and children. It was obvious from the temper of the Employer Group that the flat eight-hour day asked for by labor would have been combatted as too inflexible to suit all forms of industry. The employers would have made the week rather than the day the standard, and would have allowed variations. It was obvious too that the Employers' Group was prepared to fight the eight-hour day on the ground that many industries cannot afford it. No other expression in regard to hours came out excepting in the resolution on women and children.

Under the broad head which includes so many important things, that is, conditions of work, little came before the conference. It is rather curious that labor in its propositions had practically nothing to say about conditions. The employers put out a statement which I think a majority of the conference would not have accepted. They laid it down that the conditions under which labor works should be as safe and satisfactory to the worker *as the nature of the business permits.* There are too many loop-holes in that phrase, and it came into immediate clash with the great and powerful National Safety Council. The National Safety Council lays it down as a principle that, whatever the nature of the business, it must be made safe and satisfactory, and that it can be made safe and satisfactory to the worker if the problem is scientifically attacked.

There was only one resolution coming from the Public Group that could be classified under this head of conditions of work, and that was with regard to housing. Mr. Feiss, of Cleveland, put in a very good resolution. What he asked was, "that the Conference recommend to the President and Congress the immediate establishment of a Federal System for the creation of home loan banks, and for the release of capital for home building."

The whole problem of unemployment, which we certainly would have had to consider in some very serious way, received but little attention. Labor said nothing at all about it in its propositions, and the employers made a general statement that each establishment should study the subject. Miss Barnum, of the Public Group, put in a resolution asking that a national employment agency be established by Congress. It was a foregone conclusion, however, that with Mr. Dennison on the floor this matter of unemployment would have been pushed if we had gone on with our work.

One thing that did come before us sufficiently to have a committee formed to consider it, was the high cost of living. This subject was attacked by Mr. Russell, who brought in a resolution with a good preamble: "Resolved, that in the judgment of the Conference attempts to better the existing industrial situation should begin with a reduction in the prevailing cost of living." The absurdity of merely increasing wages when such increase is almost at once absorbed by an increase in the prices of the necessities of life is sufficiently apparent. "It is the opinion of the Conference that as a beginning the Congress of the United States should pass an anti-profiteering act like that of Great Britain, and provide also as a necessary accompaniment a measure of public accountancy for corporations." The British anti-profiteering bill was attached to his resolution.

Another attack on the high cost of living which would have been developed was through cooperation. A resolution presented by a farmer member called attention to the fact that in the present development of trade and commerce it has become necessary in many instances for producers of farm products to form cooperative marketing organizations in order to secure a money return from the sale of the product to the producers thereof sufficient to justify the continuance of the industry, and it asked that the conference recognize this as a sound and justifiable policy, which of course, would have been done.

Social insurance came up, but not in any very definite way. Mr. Dennison put in a resolution providing for insurance in the case of unemployment; and there was an interesting resolution put in by Mr. Loree of the Employers' Group, for a sort of a blanket insurance covering sickness, unemployment, old age, and death. He had it all in one. Considerable material found its way to the general committee on arbitration and conciliation.

The Labor Group in its set of propositions had one; this suggested a national conference board, which certainly would work for the prevention of trouble. "There should be established by an agreement between the organized workers and associated employers in each industry a National Conference Board, consisting of an equal number of representatives of employers and workers, having due regard to the various sections of the industry and the various classes of workmen engaged, to have for its object the consideration of all subjects affecting the progress and well-being of the trade, to promote efficiency of production from the view-point of those engaged in the industry, and to protect life and limb as well as to safe-guard and promote the rights of all concerned within the industry."

"With the further view of providing means for carrying out this policy, the Federal Government, through its Department of Labor, should encourage and promote the formation of national conference boards in several industries where they do not already exist; to still further encourage the establishment of these national conference boards in each industry, these conference boards should be urged whenever required to meet jointly to consider any proposed legislation affecting industry in order that employers and workers may voluntarily adopt and establish such conditions as are needful; and may also counsel and advise with the Government in all industrial matters whatever, whereever needful legislation is required."

Resolutions concerning arbitration and conciliation came from the Public Group, the first from Mr. McNab of the Pacific Coast. Mr. McNab wanted something similar to the late War Labor Board; a sort of a supreme court in industry made up of at least five members; one member should be a woman, appointed by the President; two members should be appointed by the Senate; two selected by the House, and the remainder of the board should be made up of expresidents of the United States and the Secretary of the Department of Labor.

The second resolution on arbitration was one of the most valuable and carefully thought out that came before the conference. It originated with Secretary Wilson and was turned over to the Public Group to present.

Secretary Wilson's proposition was this "That there shall be created a board of equal number of employers and employees in each of the principal industries and a board to deal with miscellaneous industries not having separate boards. The labor representatives on those boards shall be selected in such manner as the workmen in the industry may determine. The representatives of the employers shall be selected in such manner as the employers may determine. Whenever disputes arise in any plant or series of plants that cannot be adjusted locally, the question or questions in dispute should be referred to the board created to represent that industry for adjustment. The board shall also take jurisdiction wherever in the judgment of one-half of its members a strike or lock-out is imminent. The decisions of the board on wages, hours of labor, or working conditions must be arrived at by unanimous vote. If the board shall fail to come to a unanimous determination of any such questions, the question in dispute shall be referred to a general board appointed by the President of the United States in the following manner: one-third of the number is to be appointed in agreement with the organization or organizations of labor most representative of labor; one-third of the number to be appointed by the President uirect. Any question in dispute submitted to the general board for adjudication shall be decided by the unanimous vote of the board. If the general board fails to arrive at a decision by unanimous vote the question or questions at issue shall be submitted to an umpire for determination. The umpire shall be selected by one of the two following processes; first, by unanimous selection of the general board; failing of such selections, then the umpire shall be drawn by lots from a standing list of twenty persons named by the President of the United States as competent umpires in labor disputes. Naturally in the disputes that may be pending locally or before the industrial board or before the general board or before the umpire, the employers and employees shall each have the right to select counsel of their own choice to represent them in presenting the matter in conference.

"Whenever an agreement is reached locally or by the unanimous vote of the industrial board or general board or the decision of the umpire, the conclusion arrived at shall have all the force and effect of a trade agreement with the employers and employees, which employers and employees shall be morally bound to accept and abide by. It is understood that this plan would not interfere with any system of joint wage conferences now in existence unless the failure to agree in such a conference made a strike or lock-out imminent."

Although there were many more resolutions presented, these alone are enough, I think, to show that the conference had something in mind which, if it could have gone on, might have been developed into an interesting plan for the future conduct of industry.

If such a plan could be worked out—a plan simple, clear and logical, one that the man in the street could understand—it might be a very useful thing for the industry of the country. It might be wise for this Society to keep in mind the formulation of some such plan in case the present industrial conference does not put out anything which you can accept.

III

DISCUSSION

ROBERT W. BRUÈRE[1]: Permit me to open the discussion by focussing attention upon what seems to me the salient single fact in the reports of the two speakers tonight. Miss Tarbell said in opening her address that the Public Group was not sufficiently coherent to have any plans of its own, and both she and Mr. Dennison stressed the fact that the scientific managers were not recognized by the conference. These two facts seem to me to be a challenge to the Taylor Society and to all men who are interested in science in industry. Why were the scientific managers not recognized, and why was the Public Group so incoherent that it had no plans?

The challenge which these two statements offer to the Taylor Society, composed largely of engineers in management, seems to me to be this: that the industrial engineers of the country must so organize themselves that they may function as the mind of the public on problems of scientific management in industry. Why do they not now function as the mind of the public on the problems of science in industry? As individuals they have the necessary information; they have the necessary technique; within their own field they are as expert as any analogous body in the country. As individuals they are eager to serve not only industry but the nation. Many were in Washington ready to serve the President's Conference. Why were they not recognized? To me it seems that the necessary inference—(possibly the superficial inference)—is that they are not properly organized to function as the mind of the public and that they are not, in a sense, free men. If they had been so organized as to be able to function as the mind of the public on the problems of industrial management, and if they had been free men, they would not only have been there but they would have been recognized. So at least it seems to me.

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[1] Bureau of Industrial Research, New York.

Now why are the engineers and managers as distinct from owners, the technical experts, not free? Is not the answer to that question to be found in this other question? Why have the scientific managers been so frequently distrusted by the public at large, by the workers and to a large extent by the employers themselves? Is not the answer suggested by the fact that they call themselves managers and not administrators? They have traditionally associated themselves with one party in industry only—with the management. They have not so organized themselves as to be able to put their technical knowledge and skill at the free disposal of both parties in industry and of the general public. It is for this reason it seems to me that their mind is not recognized as the mind of the public on the problems of science in industry, that they were not recognized by the President's Conference in Washington.

Today the management engineers and managers are not free men. How can they become free men? Is not the answer that they must so organize themselves that they can exercise their science and their technical skill as public servants independently of the arbitrary wills of either of the principals in industry?

Mr. Chairman, I wanted to use my five minutes to make just this one point in the hope that it might serve to open the discussion, to focus attention upon the fundamental problem of production in industry, upon the fact that the public at large, like the Public Group at the President's Conference in Washington, are, as Miss Tarbell said, so incoherent, so vague, that they have no plans for the organization of industry at once scientific and democratic. As an outsider, as a member of the Taylor Society who is not a management engineer, I probably admire and esteem the engineers, particularly in this group, more than they admire and esteem one another. They know one another's foibles, they are conscious of their own and one another's shortcomings. To me they represent one of the great constructive forces in America. I look to them with the greatest respect, with the profoundest appreciation of the work that they have done and are doing, and with the confident hope that they will so organize themselves as to be able to function as the mind of the public on the problems of science in industry. If they do so organize themselves, no future industrial conference at Washington will dare to ignore them.

RICHARD A. FEISS[1]: I came up here because I could not let go unchallenged the implication by Mr. Bruère as to the part this Society could or was supposed to have been able to take in the late conference. If Mr. Bruère had attended the last meeting in Boston, he would know not only that there had been efforts on the part of individual members of the Society to get the kind of set-up that he suggested, but there was also a united effort on the part of the Society at the last moment to have representation of the real interest in industry—the management group. I think Mr. Bruère's point is well taken to this extent, that it is up to the management group and it is up to this management Society to give the kind of service that is needed to solve these problems. Here in this Society are the men with the brains and knowledge to do it; and I wish to say that they were willing and ready, and I know personally that there were many members in each conference group who had in their hands information necessary to the functioning of the conference which was furnished by men in this Society. We would have been called upon when the time came if the conference had gone on.

I wish to say just one word more about the conference, a word from one who was on the outside but who was looking in, and that is this: it was not any lack of willingness to serve on the part of the managers of the country, and it was not that there were some bad breaks in the set-up of the conference, but there was one big failure that made sure the defeat of its purpose, and that was the failure shown, not in the personal set-up, but in the moral set-up of the whole conference. In order to solve the problems that confront every group in industry, it was essential that it conceive industry in the right moral aspect and that aspect is a very simple one. If the men from whatever walk of life, whether they were real or unreal representatives, had come to Washington with the understanding that industry like every other human activity must be a public service, and had come with the idea of public service, and that group service was subsidiary to public service, the conference would have been bound to get along regardless of the meaning of words or regardless of the suspicions of each other.

F. A. SILCOX[1]: The two addresses of the evening hour come very close to home to me, because we have for the past six weeks been going through the process of collective bargaining in detail here in New York in the adjustment of wages, hours and working conditions in the allied printing trades group.

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[1] The Joseph and Feiss Co., Cleveland, O.

[1] United Typothetae of America, Chicago, Ill.

The big question involved is whether or not we recognize collective bargaining as essential to industrial progress and stability. If we do, then the details can be worked out and no one feels that they involve any insuperable difficulties. A new series of conferences should be held based essentially upon a different plan of organization from that of the late lamented conference. The idea would be to have the industries themselves which are organized properly represented. For example, the printing industry already has a national joint conference council, made up of equal representatives of the International Employing Printer's and the International Unions, which can express the general policies of the printers and can secure proper representation at a national conference. Similarly other organized sections of industry can be represented.

If representatives can be selected from those industries which are organized, it seems to me that you can in this way get a well-balanced representation of the various industries and let them express themselves on what policies they think should be followed. If the unorganized group feel that they do not want to go along on the policy outlined then let them express the policy they want to follow and see if any reconciliation can be made between the two.

I want emphatically to subscribe to the broad democratic approach outlined by Mr. Dennison. I think that he has brought out the essence of the problem.

CHARLES W. MIXTER[1]: I was not at Washington at the conference but I have had occasion to read a great part of the stenographic reports of the proceedings, had occasion to study and take notes on them. Also I have had conversations with some of those who were there and who told me what went on behind the scenes which didn't get into the stenographic reports of the proceedings.

Mr. Dennison and others have maintained that the employers did not break with the conference on the principle of collective bargaining. Also, it has been said by some people, and hinted at by others, that the resolutions on collective bargaining which were presented to the conference, now in one form and now in another with slightly different wording, were unnecessarily fussy and legalistic. I cannot agree with these views. I think the resolutions on collective bargaining embodied very well the vital issues at stake, and the vital issues at stake were two different economic philosophies; not merely different philosophies of industrial relations, but economic philosophies in general. The Employer's Group, or rather that section of it which dominated that very unhomogeneous body, was opposed not to the abuses of unionism but to unionism itself. Because real collective bargaining involves recognition of the union, and dealing with union representatives, they are opposed to any endorsement of real collective bargaining; that was the issue on which the conference broke up. The employers were willing to endorse collective bargaining if it meant mere shop committees, or so-called company unions, with no intervention of outside representatives of labor. Of course such acceptance of limited collective bargaining—group bargaining with a string to it—was rejected by the Labor Group as not constituting acceptance of the principle of collective bargaining.

And now for a brief consideration of the deeper economic reasons for the position taken by the Employer's Group. For one thing they realized that in competitive industries with many small employers, if there is dealing with strong unions, the employers themselves must unite in employers' associations. The dominating section of the Employers' Group is not ready for that. They think that means danger to our competitive system as a whole, and they want to keep that and the old employer's paternalism intact. It is not using an abusive term, but scientifically descriptive, to call them reactionary. After the Napoleonic Wars, when the Holy Alliance undertook to put everything back where it used to be before, that was reactionary. Now, after this war, with its immense forces of upheaval and change, these employers we are talking about (not all employers) want to put things back. They expect that presently unrest will blow over, that people's nerves will calm down, that things will come back and be back to normal, and that that "normal" will be the old nineteenth century unmitigated competition with the employer holding substantially the position he has had in the past. These beliefs and this program are founded, in my opinion, on ignorance. For one thing, those who entertain these views believe that England, before the war, was being absolutely ruined by unionism. Therefore, don't talk about Whitley Councils to them. If England wants to commit industrial suicide that way, that is her affair. We don't want any of that sort of thing in this country.

They get their information in great measure from biased and unreliable sources, as, for example, from that series of articles in the London *Times* some fifteen years ago, republished in book form. I have forgotten the name of the volume, but the author's name is Pratt. I had that book on my desk a few days ago and looked it over. Not one word from cover to cover about the Lancashire cotton industry, which is the most completely unionized industry in Great Britain. Anti-union employers in this country talk much about how unionism will choke production. It has had just the opposite effect in the British cotton industry. In that industry the unions have got the employers so sewed up with respect to competing by means of debasing labor standards, that the employers' managers have to be efficient. And they are efficient. As every one here well knows, they export their products all over the world in successful competition with everybody else in the business, and with their chief raw material coming from distant parts of the earth.

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[1] National Industrial Conference Board, Boston, Mass.

THOMAS W. MITCHELL[1]: I think perhaps I can contribute best to this discussion by formulating a problem, the importance of which has dawned upon me in the last few months as a result of the operation of a joint industrial council in this city. In the men's and boys' clothing industry we have an association of employers and also a union, and an agreement between the two whereby a joint industrial council has been formed which is presided over by an impartial chairman selected by both sides. During the spring and summer we have made, I believe, four adjustments and every one of them thus far has been broken.

The problem of importance which has dawned upon me exists because of this condition, namely: that there is in the ranks of the workers, and of the minor union officials, a lack of responsibility for the agreements which they enter into or which are entered into for them by their representatives, and also a similar lack of responsibility on the part of employers whereby both sides after making an agreement go out and promptly break it.

To illustate, early in August the union government made a demand upon the association for a general increase in wages which was refused by the employers and thrown into arbitration. The impartial chairman granted a general $5 increase to all the tailors in the market and attached certain conditions to his grant, namely; that this settlement was to endure until December first; that no employee or union representative was to make any demand upon his employer for a further increase until that time; that no employer was to grant such an increase or even discuss the subject with an employee or a representative of the union; that if any worker had any demand to make he should present it through the joint board of his union upon the association representative.

The impartial chairman made his wage increase award about 11:30 A. M., Friday, August 14th, and in spite of the fact that the managers of the union had agreed to the arbitration proceeding and to abide by the decision of the impartial chairman, before 6:00 P. M. that afternoon the manager of a local union had obtained an additional $1 increase from six shops. Not only did many of the minor union officials repudiate the authority of their managers to make agreements for them, but workers themselves do not seem to appreciate that when their elected representatives have made an agreement for them they have a moral obligation to live up to that agreement.

It would be unfair to make this criticism of the union officials and the workers without at the same time putting the proper responsibility upon the employers, for they also have failed to realize their moral obligations under the agreement and have broken them with the same facility as the other side. Therefore, I say that there is the problem of educating both sides so as to instill into both workers and employers a proper sense of responsibility to their obligations.

MRS. JEAN HOSKINS[1]: I attended every session of the President's Conference, and feel that there were a number of important things that occured which have not been emphasized enough by any of the previous speakers.

To me there was a great deal of significance in the fact that almost every real employer—and by that I mean the man who owns and operates his own plant—did indorse collective bargaining and came out openly for it in his discussions, even to the extent of condemning the Employers' Group for their lack of cooperation and for their attitude of approach to the serious situation confronting industry. Mr. Endicott's fearless denouncement of the so-called Employers' Group and his unwillingness to have their action announced to the country as an expression of the opinion of the real employers, was upheld by such men as Mr. Dennison, Mr. Landon and Mr. Titus. The action of these men, the real employers, was to a great extent obscured by their being members of the Public Group; and Mr. Endicott seemed to regret that the employers in the Employers' Group were held responsible for decisions made by lawyers, bankers and men remote from industrial situations, by whom the so-called Employers' Group was largely represented.

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[1] Clothing Manufacturers' Industrial Exchange, New York.

[1] Consultant in Labor Management, New York.

Within the Employers' Group itself the farmers rose to announce their sympathy with the views of the Labor and Public Groups, and to protest against the action of their own body.

Mr. Lee of the Railroad Trainmen, Labor Group, in voicing his regret at the failure of the conference, turned on the Employers' Group and denounced them for dragging in controversial questions, particularly that of the open shop. He announced that for the first time in his life he and his fellows in the Railroad Brotherhoods were being driven to an understanding of, and sympathy with, the position of the A. F. of L. on the question of the open shop, to the extent of indorsing it themselves, a question upon which until this time they had been at variance.

It seems to me that at this meeting the reviewing of various resolutions that were merely presented to the conference without being accepted or even discussed at the open sessions, is of much less importance than an understanding of the facts I have mentioned and which have not been generally known by the public.

The suppression and distortion of the news of the conference is to be deplored, and should be counteracted in some way.

I think it makes a difference to have every one know the opinion of the real representative men and women at the conference. As I say, the real employers took a very admirable stand which is apparently not known throughout the country. Mr. Endicott's attitude, his whole discussion of the approach and action of the so-called Employers' Group and their lack of cooperation, ought to be made generally known; people ought to know how the real employers honestly feel.

MORRIS L. COOKE[1]: One can recognize that there are a large number of high-minded, public-spirited, sincere people who do not believe in collective bargaining, and yet hold to the theory that the intelligent opinion of this country today is unreservedly for some fair form of collective bargaining. As to the kind of collective bargaining there is ample room for debate. But as between the individual as contrasted with the collective bargain American public opinion supports the latter.

Granted this as a theory the argument is apt to take this form: on the one hand you have the trade union movement and on the other hand the shop union movement, but you don't have to make final acceptance of either one of them. Where the objectives of the trade union movement are wrong they will be checked by the development of the shop union movement, and if, as some people believe, the shop union movement is to afford an ultimate solution, then the trade union movement will die out. In either event society will be happy and things will go forward.

I believe that it is necessary for this Society to recognize a further and what seems to me an incontrovertible fact, which proves the fallacy of this line of thought, and that is, that any grouping of the workers of this country which will be ultimately satisfactory and give the efficiency and the economies which society will ultimately demand, must be on a national basis; shop unions unaffiliated on a national basis will not suffice. Personally, I have reached that conclusion with a good deal of reluctance. I am not by any means in sympathy with all the objectives of the trade union movement in this country. I have frequently taken occasion to say that in some respects their practices are immoral and their policies short-sighted. I should like to feel that in the shop union movement we have a mechanism by which society can force the trade union movement to rectify its course where that course is wrong. A protracted strike early in the textile industry gave a clothing establishment with which I am associated a record of about forty per cent of employment during the first six months of this year simply because we could not get our cloth. As a result of our experience and the experience of other establishments in this country, the national organization of employers cooperating with the national organization of employees have notified the textile industry that hereafter we are not without interest in labor disputes and the causes of interruption in the industry that provides us with our raw material.

Now if we are going to be able to bargain and plan on a great big national basis and ultimately on an inter-national basis, the shop union will afford no ultimate relief. The members of this Society must in the end address themselves to the organization of a national labor movement and a national organization of the employers and a national organization of the industries—otherwise we shall fail.

WALTER POLAKOV[1]: It may not be out of place to supplement the statements made by the two distinguished speakers, members of the President's Industrial Conference, by a few comments of an outsider. The thing that is most striking in the accounts of that failure to accomplish a real work in the face of the "danger," using the words of President Wilson, which

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[1] Consulting Engineer in Management, Philadelphia.

[1] Consulting Engineer, New York.